WOOD WORKING digest

AUGUST 1951

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A HITCHCOCK PUBLICATION

The new **SPOTNAILER** speeds production of case backs and a thousand other soft or hardwood nailing jobs. Bigger magazine requires less frequent re-loading. New driving mechanism assures long, dependable service. Let us show you how much better, faster and cheaper your products can be nailed with Spotnailers.

SPOTNAILS, INC.

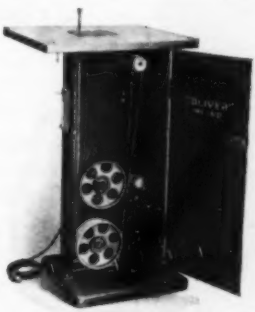
EVANSTON 1, ILLINOIS

"OLIVER" JIG SAW

Smoothly, swiftly saws interior and exterior scrollwork

Now you can dress up your line with smart pieces of scrollwork and fretwork, produced at small cost on this "Oliver" Jig Saw. The table of this machine is turned one-eighth way around, and there are 36½ inches between the saw and column. This permits sawing of stock of almost any length and width. New saw tension device results in smoother operation and better work. The operator easly controls the saw with a foot lever operating both the motor and brake. Table can be tilted 30° to right and left of saw. For full details, **write for Bulletin No. 173E.**

- **Quick, easy insertion of saw**
- **Simple foot-controlled clutch and Brake**
- **Table turned ⅛th way around — takes long and wide stock**
- **Exclusive tension device effects smoother running and finer work**
- **Continuous air blast keeps saw clear**
- **Steel pitman and channel section and bronze cross-head—lightweight, rigid**
- **All parts interchangeable**



This "Oliver" Scroll Edge Sander smoothly sands inside and outside edges of grills, banisters, etc. Does the work of four men, and does it better. Investigate.

OLIVER MACHINERY CO., GRAND RAPIDS, MICH.

Synonyms for

IN PLYWOOD PRODUCTION, MELURAC® 300 MEANS . . .

ver'sa-til'i-ty—*ability to turn with ease from one task to another.* MELURAC 300 is equally at home in hot pressing for flat and molded plywood, or cold-clamping with kiln cure for heavy laminated work.

du'ra-bil'i-ty—*ability to endure.* MELURAC 300 bonds are boil-resistant, more than meet bonding requirements of exterior grade plywood conforming to Hardwood-Plywood Commercial Standards (Type I) CS-35-49 and Military Plywood Specification MIL-P-66A

speed—*rate of performance.* MELURAC 300 with Hardener M-325 has phenomenally fast cure time, approximately the cure rate of hot press Urea resin adhesives.

And MELURAC 300 also means stain-free (no bleed through to cause costly rejects), neutral glue line, good "pot" life and long assembly time. In short, MELURAC 300 means more successful plywood bonding!

We may be able to help you meet military specifications where plastics and resins are concerned. What's your problem?

Successful Bonding

IN WOOD WASTE BONDING, MELURAC 301 MEANS . . .

e-con'o-my—*method to keep down expenses.* Costwise MELURAC 301 compares favorably with other thermosetting resins used for wood-waste bonding, and its added efficiency means greater production savings.

sta-bil'i-ty—*ability to last.* MELURAC 301 is water-white with color-fastness. Its lower temperature curing range promotes dimensional stability, and its durability imparts superior weather resistance.

MELURAC 301 also means fast cure time at intermediate temperatures. In short, MELURAC 301 means more successful wood-waste bonding!

Looking for the adhesive that means success in your operations? Then fill in the coupon and mail it, today!

STICS DEPT., AMERICAN CYANAMID CO.
Rockefeller Plaza, New York 20, N. Y.

Please have your Technical Service Representative call.
Please send me your recommendations for . . .

Hot-Pressing	Boil-Resistance
Cold-Pressing	High Moisture-Resistance
Edge-Gluing	High-Frequency Gluing
Tapeless Splicing	Gap-Filling
Assembly Work	Non-Staining
Moderate Moisture-Resistance	

ME_____ TITLE_____

MPANY_____

DRESS_____

AMERICAN Cyanamid COMPANY

PLASTICS DEPARTMENT

32A Rockefeller Plaza, New York 20, N. Y.

In Canada: North American Cyanamid Limited, Royal Bank Building, Toronto, Ontario, Canada

BEACH SWING CUT-OFF SAW

$395.00 F.O.B. FACTORY

TABLE $195.00 EXTRA

WRITE FOR FREE FOLDER

Beach Swing Cut-Off Saw shown above is popular Model #605 furnished with built-in 5 horsepower electric motor. Also available with 3, 7½ and 10 horsepower motors. All machines are self-contained units of Steel construction. Swinging arm is mounted on ball bearings and has vertical adjustment of 2".

BEACH

MANUFACTURING CO. • MONTROSE, PA.

Wood Working Digest

AUGUST, 1951 — OUR FIFTY-THIRD YEAR

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Stay Sharp Because They're TOUGH!

ATKINS *"Silver Steel"* band saws are designed and built for rugged service! Uniform in quality, properly heat-treated, correctly set and filed—these precision-made saws assure the longest possible service at minimum maintenance expense! They are easy to file! They cut smoothly and true! In short—like *all "Silver Steel"* products—they'll save you money and serve you better.

ATKINS Improved Diamond Point FILES

Here's the proper cut file for your filing machines! ATKINS *"Silver Steel"* files are above and apart from *ordinary* files. They stand *highest* quality at lowest cost!

E. C. ATKINS AND COMPANY

Home Office and Factory: **402 S. Illinois St., Indianapolis 9, Ind.**
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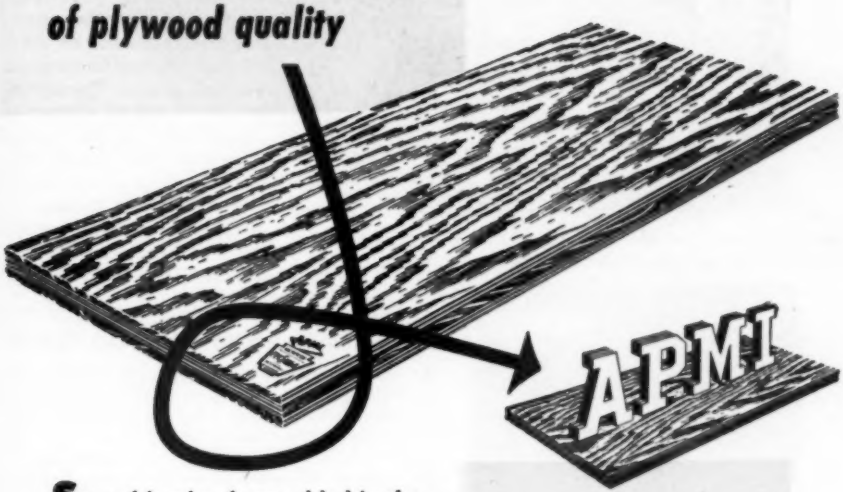
AAA TRADE MARK ATKINS "ATKINS ALWAYS AHEAD"

ATKINS

Silver Steel PRODUCTS

TRADEMARKED

as well as grademarked ...your double guarantee of plywood quality



Something has been added in the labeling of plywood produced at Associated Plywood Mills, Inc. It is the APMI trademark, and you'll find it together with the DFPA grademark on both exterior-type and interior-type panels manufactured by this company.

This combination of trademark and grademark is your assurance that regardless of where you buy APMI plywood, you get the guaranteed products of a pioneer mill in the industry. There is a type, size and grade of APMI plywood for every building need . . . Sold from centrally located sales warehouses and sold by experienced plywood men who welcome your inquiries for general information, for prices, for delivery schedules.

APMI SALES WAREHOUSES

925 Toland St., San Francisco
4814 Bengal St., Dallas
4003 Coyle St., Houston
4268 Utah St., St. Louis
1026 Jay St., Charlotte, N. C.
Eugene and Willamina, Oregon

APMI MILLS

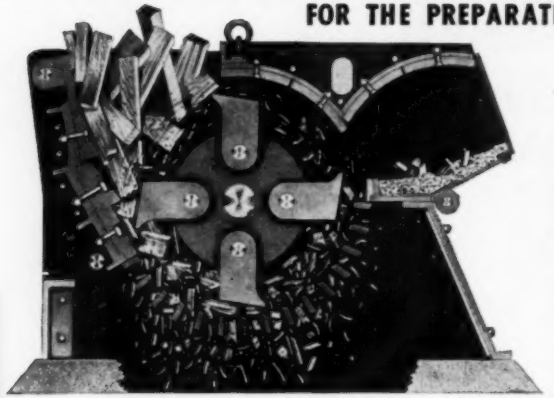
PLYWOOD—Eugene, Oregon
PLYWOOD—Willamina, Oregon
LUMBER—Roseburg, Oregon

ASSOCIATED PLYWOOD MILLS, Inc.

General Offices: Eugene, Oregon

WILLIAMS "NO-NIFE" HOGS

FOR THE PREPARATION OF WOOD REFUSE FOR BOILER FUEL



Sectional drawing of Williams "No-Nife" Hog showing how the fast revolving hammers cut the wood refuse by impact.

Williams new and improved "No-Nife" Hogs are now offered for use in all wood working plants. Experience has proven, that when properly handled, wood refuse is the cheapest fuel for all wood working plants. Therefore, the wood refuse utilized in this manner not only insures a proper fuel supply, but also provides a convenient and economical method of cleaning the refuse from the mill and disposing of it without additional expense.

Hog fuel as made with the improved "No-Nife" Hog.

ALSO USED FOR REDUCING WET OR DRY VENEER AND PLYWOOD SCRAP

The Williams "No-Nife" Hog will reduce wet or dry Veneer and Plywood Scrap to a uniform size wth no long slivers or big pieces—thus the finished product can easily be handled in pneumatic air lines. No need to worry about elbows of your system becoming clogged. Hundreds of satisfied users attest to their dependability.

WCS1-2

CHECK ✓ THESE FEATURES

- Many sizes of "No-Nife" Hogs to choose from.
- Adjustments to overcome wear.
- Larger feed opening.
- Hinged cover—instant accessibility.
- No knives to sharpen or be damaged by tramp iron.

WILLIAMS ALSO MAKES...

Hogs and Shredders for making wood flour and sawdust. Vibrating Screens and Air Separators to work in closed circuit with our Shredders for absolute control of product size.

Williams Patent Crusher & Pulverizer Co.

808 St. Louis Ave. • St. Louis 6, Mo.

WILLIAMS

CRUSHERS GRINDERS SHREDDERS

No mixing—Simply stir into water and use.

NO-MIX TAPELESS ADHESIVE SPLICES VENEERS 30% FASTER

Now you can bond veneers permanently, invisibly, in 30% less time—*without* mixing or taping. Simply stir UFORMITE JS-508 one-component adhesive into water and apply at the jointer or splicer.

No other veneer-splicing adhesive offers so many time-saving advantages. There's no guesswork; UFORMITE is pre-catalyzed and pre-lubricated. Long pot-life (8 to 12 hours at 75° F.) lets you prepare the whole day's batch at one time. Wide assembly time (10 minutes to 5 days) permits week-end storage of spread veneers. And under normal conditions, storage life is over a year.

Send for free technical data. Manufacturers are splicing 70,000 miles of veneer per month with UFORMITE JS-508. For fast, easy production on conventional or high-frequency splicers, get full details of dust-free, powdered UFORMITE JS-508 adhesive today. No obligation.

CHEMICALS FOR INDUSTRY

ROHM & HAAS COMPANY

THE RESINOUS PRODUCTS DIVISION

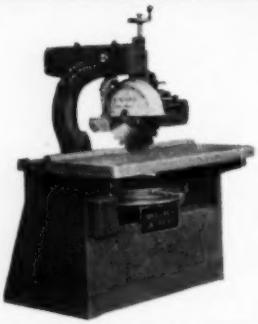
Washington Square, Philadelphia 5, Pa.

Representatives in principal foreign countries

UFORMITE*, TEGO*, AMBERLITE*—famous names in resin adhesives.

*Trademarks—*Reg. U. S. Pat. Off. and in principal foreign countries.*

MONARCH MACHINES
Designed for Profitable-Production!



MONARCH UNI-POINT RADIAL SAW
MODEL X36-AF

Revolutionary in performance, speed, accuracy and safety. Exclusive Uni-point principle means that the saw blade always enters the wood at the same point in the table, regardless of the cross cut angle. Increases man-hour production by 25%.

20" HEAVY-DUTY BAND SAW
MODEL 72-B

Has every modern feature for precision heavy-duty production. Fully guarded ball-bearing wheels, ball-bearing roller guides, positive saw aligning and tensioning device. Direct or V-belt drive.

16"-18" TILTING ARBOR SAW BENCH
MODEL X24-B

Accurate and dependable for heavy production. All adjustments, convenient, easy-to-operate and safe. Capacity to 4½". Table 36" x 40". Saw tilts to 45°. 5-7½ H.P. Motors.

20" PLANER NO 41.

Outstanding, low priced, general purpose planer. Turns out large volume of quality work at low production cost. Capacity 20" x 6". Two speeds: 24 and 36 FPM. 4-knife safety cutter head.

8" BALL-BEARING JOINTER
MODEL X-13

Precision machine for quality work. 3-knife safety head. Steel table lips, guarded front and back. 60" table. Heavy cast-iron floor stand. Tilting fence. Direct drive motor.

Send for literature giving complete details on Monarch Profitable-Production machines.

Manufactured and Guaranteed by

MONARCH

AMERICAN SAW MILL MACHINERY CO.

Quality Woodworking Machines Since 1903

204 MAIN STREET, HACKETTSTOWN, N. J.

"They always stay true-to-pattern, too!"

Talk to any user of Jones & Orth Cutter Heads and you'll hear *plenty* of good reasons why they're enthusiastic about them.

Those who keep the closest check on *both* quality and costs are always our strongest boosters. And—the tougher the job to do, the more likely it is that you'll find Jones & Orth Heads being used!

If YOU want cutter heads that will do a consistently better job—turn out higher quality work, at LOWER net cost—your best bet is unquestionably Jones & Orth.

The way to prove this to your own satisfaction is to install a set of our cutter heads on your hardest working unit, then compare output—and costs!

Write today for new catalog, and name of our dealer nearest you. Address either our Seattle or Memphis branch.

Need specially designed cutter heads? Let our engineers help! Write us in detail. Prompt service!

JONES & ORTH

CUTTER HEAD COMPANY

385 SOUTH MAIN STREET
MEMPHIS 3, TENN.

BOX 3064
SEATTLE 14, WASH.

LET'S FACE IT...

GREEN LUMBER WON'T SELL!

● Lumber plant operators know that nothing kills off repeat business or a reputation faster than green lumber!

And they know that you can't get the profits without both. The first Standard Dry Kiln was built over 60 years ago to end the green lumber problem for good.

YOU can build your reputation on Standard! Standard kilns increase production output and eliminate costly green lumber boomerangs. Their internal fan construction and automatic reversible cross-recirculation assure faster, more uniform drying and lower operating costs! It all adds up to greater profits for YOU!

Whether you need a single unit, a full battery of kilns, or need to remodel your old natural draft kilns, insist on results that will build your profits and reputation . . . *demand* STANDARD!

The Tell City Furniture Company has learned from profitable past experience with Standard Dry Kilns that exact conditions throughout every kiln load pays off in lower drying cost.

Manufacturers of Internal Fan Kilns

Write for illustrated Standard Catalog

STANDARD

Engineers and Manufacturers Since 1897

DRY KILN COMPANY

P. O. BOX 5708 • INDIANAPOLIS, INDIANA

...there is no finer saw made!

WHITNEY No. 177 Variety Saw

For High Production Low-Cost Sawing

Investigate the Whitney No. 177 Variety Saw's ease of operation, accuracy, versatility, and capacity for large production. It will handle your long runs and straight production sawing with ease and at lowest cost.

The adaptability and quick set-up features of the No. 177 also make it the ideal saw for the wide variety of sawing required in the average woodworking shop. Whitney accuracy and precision workmanship assure life-long dependability, trouble-free service and lowest cost sawing. For complete information write for bulletin D8.

Table, 53½" x 40"

Saw tilts to 45°

Cuts stock to 4" thick

Rips up to 29½" wide

Dado heads up to 3" wide

2 Quick-setting, easy-reading Cut-off Gages

5-position Rip Gage with micro adjustment at each position

Graduated Rip Scale — built into table

WHITNEY

BAXTER D. WHITNEY & SON, Inc.

PLANERS • SHAPERS • VARIETY SAWS • MORTISERS • BACK KNIFE LATHES

WINCHENDON, MASSACHUSETTS, U. S. A.

At Last

A FASTER, MODERN, BETTER WAY TO PREPARE HOLES FOR WOOD SCREWS!

U. S. and Foreign Patents Pending

REDUCE LABOR COSTS, PRODUCE STRONGER JOINTS, BETTER LOOKING FINISHED WORK WITH NEW SCREW-MATE 3-IN-1 DRILLS!

Screw-Mate

TRADE MARK

COMBINATION 3-IN-1 DRILLS

① COUNTERSINK
② DRILL SHANK CLEARANCE
③ DRILL TAPERED PILOT
In ONE Quick and Easy Operation
Screw fits perfectly in tapered Screw-Mate hole. Every thread holds tightly!

IMPORTANT NEWS! Please read this ad carefully!

Sensational Screw-Mate Invention Acclaimed By Woodworkers Throughout U. S.!

Here's the drill the whole woodworking industry is talking about! Screw-Mate is a twist drill that is both straight and tapered to correspond exactly to the shape of a screw, from head and shank to tapered pilot. It is made in a variety of sizes for use with most screw sizes on wood, plastics, synthetics, etc.

SCREW-MATE SAVES TIME! When a Screw-Mate is drilled into a piece of wood, it makes a hole shaped like its corresponding screw size (slightly smaller, of course, to allow the threads to hold securely). This means that *one* Screw-Mate drilling operation countersinks, drills shank clearance and tapered pilot hole—all at the same time! Special 4-in-1 drills *counterbore*, too!

Screw-Mates eliminate 3 or 4 drilling operations and the necessity of attaching and adjusting countersinks or counterbores to drills. Even inexperienced workers can use Screw-Mates to drill holes exactly the right size. Drill shoulder stops drill at correct depth every time!

SCREW-MATE MAKES SCREW-JOINTS STRONGER!

The *tapered* hole made by a Screw-Mate drill enables every thread on the screw to hold tightly—right down to the tip. (An ordinary drill bores a straight pilot hole—allows only part of threads to come in contact with wood. Strength is sacrificed.) Screw-Mates are slightly smaller than corresponding screw diameter to provide a good, snug fit. In many cases this increased holding power allows use of smaller screws.

SCREW-MATES ARE

* **VERSATILE!** Screw-Mates fit any drill press, drill gun, or hand drill. Can be used to drill a wide variety of material, including hard or soft woods, plastics, slate, synthetics, etc. Screw-Mates are available in many sizes for all your needs.
* **LONG-LASTING!** Made of tough, durable high-tungsten steel, precisely hardened and ground, Screw-Mates outlive ordinary drills.
* **ECONOMICAL!** The many cost-cutting, quality-improving features of Screw-Mate drills make them the biggest drill bargain of the decade!
* **PACKED IN HANDY DRILL-HOLDER-BOX.** Box of 5-drill utility set can be used as a stand to hold Screw-Mates. Keeps drills handy, ready for use.

Start using Screw-Mates in your plant now! Once you see how they save time and improve the quality of your work, you'll never be without them! And if you have any special drilling problems, let us know. We may be able to help. Order all the Screw-Mate sizes you need — today!

(Inquiries invited from retailers, wholesalers and sales agents.)

JUDGE FOR YOURSELF! Compare the improved Screw-Mate method with the old way of drilling holes.

THE OLD WAY

3 drills needed for 3 separate operations.

Only part of screw threads do the holding.

THE SCREW-MATE WAY

One Screw-Mate drill performs 3 operations in 1.

Every screw thread holds 100%!

QUICK FACTS ABOUT SCREW-MATE DRILLS

SCREW-MATE:

* **SAVES TIME!** Prepares holes *completely* in one quick operation!
* **MAKES SCREW-JOINT STRONGER!** Every thread on screw has 100% holding power!
* **PRODUCES BETTER LOOKING WORK.** Depth of countersink is always correct and uniform, giving screw head snug, attractive fit.

SCREW-MATE SIZES NOW AVAILABLE!
(New sizes are frequently added. Check your special needs with us.)

HANDY UTILITY SET
(consists of 5 commonly used sizes)

Drill Sizes	
#7 x 3/4"	#8 x 1 1/4"
#8 x 1"	#10 x 1 1/4"
	#12 x 2"

Diameter of drill shank is 1/4"

$3.75 FOR SET OF FIVE DRILLS

SCREW-MATE COMBINATION COUNTERBORE, COUNTERSINK & TAPERED DRILL

Drill Size	Plug Size
#10 x 1 1/2"	3/8" x 3/8"
#12 x 1 1/4"	1/2" x 1/2"
#12 x 1 1/2"	1/2" x 1/2"
#12 x 1 3/4"	1/2" x 1/2"
#14 x 2"	1/2" x 1/2"
#18 x 2"	5/8" x 5/8"

Diameter of drill **$2.50 EACH** shank is 1/4"

Individual Drill Sizes

$.75 each
#5 x 1/2"
#6 x 1/4"
#7 x 1/4"
#8 x 1/4"
#8 x 1"
#8 x 1 1/4"
#8 x 1 1/2"
#10 x 1"
#10 x 1 1/4"
#10 x 1 1/2"
#10 x 2"
#12 x 1 1/4"
#12 x 1 1/2"
#12 x 1 3/4"
#12 x 2"
#14 x 1 1/4"
#14 x 1 1/2"

$1.00 each
#12 x 2 1/2"
#14 x 2"
(Diameter of drill shank is 1/4")

ORDER SCREW-MATES FROM YOUR HARDWARE DEALER OR SUPPLY HOUSE. IF LOCAL SOURCES CANNOT SUPPLY YOU, ORDER DIRECT!

Tear out coupon and mail today!

110 HOSPITAL ST., PROVIDENCE, R. I.
Distributing Office for the Mfgr.

Gentlemen:

☐ Please rush me postpaid the Screw-Mate drills I have circled on this page. Total amount $_____.

☐ Send me the Screw-Mate counterbore drills I have circled on this page. Total amount $_____.

☐ Send me FREE additional information on Screw-Mates.

☐ Check enclosed ☐ Bill me

Name _____

Company _____

Address _____

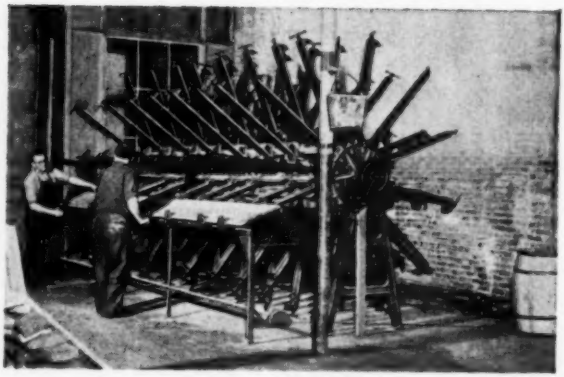
Local Dealer _____
(Please include name and address of dealer who usually supplies you. Print in margin if necessary.)

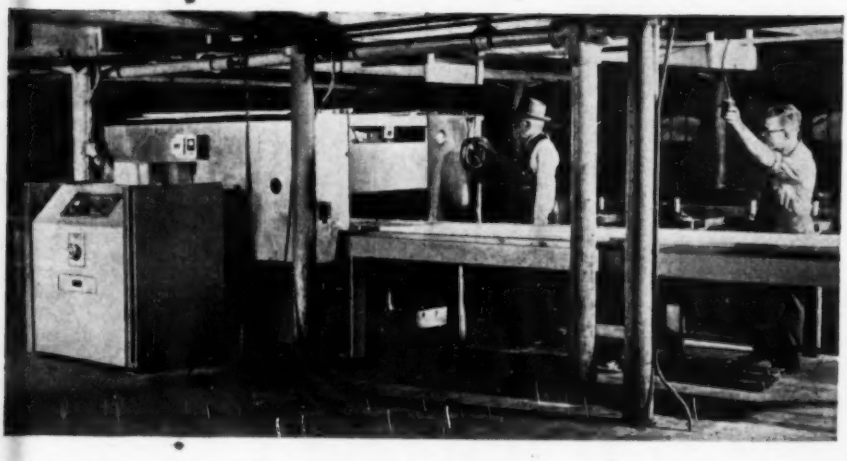
YOU CAN BE **SURE**... IF IT'S

Westinghouse

Before

Two men worked 8 hours to turn out 120 soft pine spinning creel boards. Planing and finishing were delayed 24 hours. Gluing maple and birch press rolls also took 2 full-time men. Rejects were high.





After

Now, using a Westinghouse 10 KW RF Generator in the installation shown here, 2 men working only *part-time* do both gluing operations. Planing and finishing are done immediately after gluing. There are virtually no rejects at all.

.... THE *Before* AND *After* STORY OF A $13,550.00 YEARLY SAVING!

For Saco-Lowell, manufacturer of fine textile machinery, the ancient glue wheel and hand clamps hardly approached the production-output and product-quality they desired. What finally led to annual savings of over $13,550? Westinghouse Dielectric Heating!

Now with RF Heating, gluing spinning creel boards and press rolls takes less than half the manpower, saves over 40,000 board-feet of lumber every year by elimination of rejects and salvage of formerly waste material, floor space is cut in half.

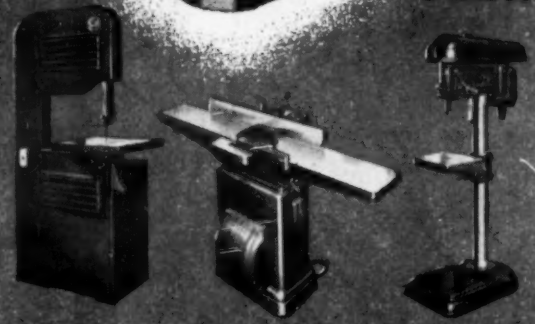
The annual savings of over $13,550 from labor and lumber more than paid for the installation in less than one year. And this does not include the added savings from production increases, less floor space, and improved quality!

Find out *today* how *your* plant can increase production and cut costs. Call your local Westinghouse representative for a free copy of our new booklet, *"RF Heating for the Woodworking Industry."* Or write Westinghouse Electric Corporation, Dept. W-21, 2519 Wilkens Avenue, Baltimore 3, Maryland.

J-02231

DELTA
MILWAUKEE
®
new
in every way
Greater Safety!
Bigger Capacity!
Greater Accuracy!
More Convenience!

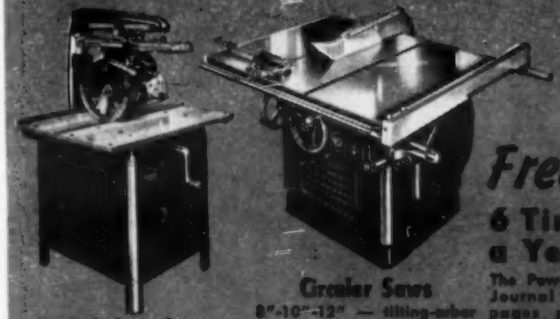
DELTA-MILWAUKEE® 13" x 5" PLANER



Band Saws 14"-20"-36"

Jointers 6"-8"

Drill Presses 14"-17" — 144 models



Radial Arm Saws 4 models

Circular Saws 8"-10"-12" — tilting-arbor or tilting-table

Equip your shop with DELTA... the world's most complete woodworking line

Imagine a planer handling short 6" stock unbutted — and extra-size stock up to 13" x 5". This new Delta does! And it's *totally enclosed* — the safest planer you can buy.

But that's not the half of it! You get these exclusive features, besides: Fingertip clutch control. Depth scale you can read from any position. Individual blade adjustment and simplified measuring device that make blade-setting easy. Cutterhead you can change without taking machine apart.

You get *extra value* in every machine in Delta's complete woodworking line. That's why so many woodworking shops equip with Delta machines — high in quality, low in cost. Make yours a Delta shop. Send for details.

Sold only through authorized dealers — available on easy time payments. Look for the name of your Delta dealer under "Tools" in the classified section of your telephone directory.

DELTA POWER TOOL DIVISION

Rockwell Manufacturing Company

MILWAUKEE 1, WISCONSIN

Free...

6 Times a Year!

The Power Tool Journal — 12 pages packed with detailed job data, fully illustrated — handbook of time-and money-saving ideas!

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Delta Power Tool Division
ROCKWELL MANUFACTURING COMPANY
601H E. Vienna Avenue, Milwaukee 1, Wisconsin

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- ☐ The Power Tool Journal — 6 times a year.
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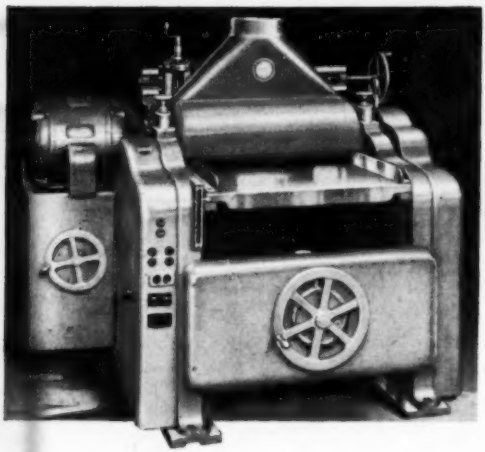
W-64

Unmatched for PRECISION PLANING

BUSS CABINET SURFACERS

READILY MAINTAIN TOLERANCES AS CLOSE AS .002"



BUSS No. 44 Single Surface Cabinet Surfacer — The complete line contains a type and size for every production set-up. Singles — small, medium and large; Double Surface type and the No. 55 for surfacing rough lumber. Bulletins on request.

Fine finished planing is produced by BUSS cabinet surfacers, in the hands of the average operator, with greater consistency than with any other planer. The reason for this is, that in addition to being built throughout for precision production, BUSS Surfacers are equipped with semi-automatic controls (exclusive BUSS features) which make it easy for the operator to get perfect settings, almost instantly.

For the greatest production of the kind of planing that saves time on following operations, investigate BUSS Cabinet Surfacers. There's one that ideally suits your needs.

ELIMINATION OF SHAVING PRINTING"

Check your dust removal system. A weak or inadequate system is frequently the cause of this trouble. Further insurance against shaving printing is provided by the "Shearing Bar" — an exclusive, BUSS feature. Write for further details.

PLANER SPECIALISTS EXCLUSIVELY

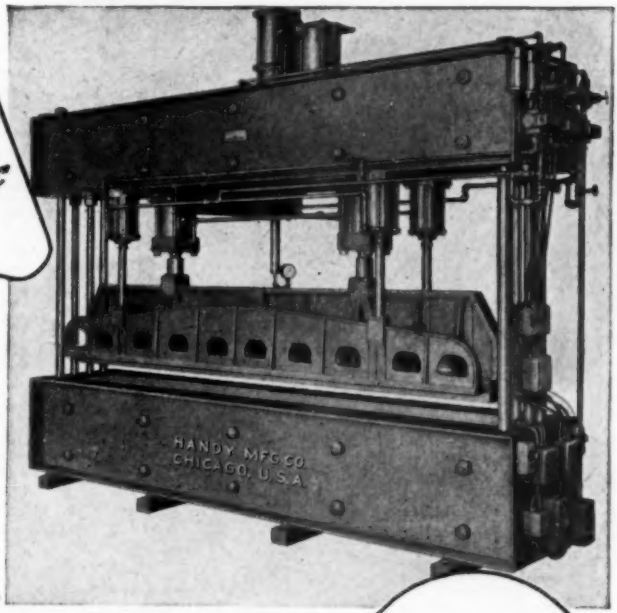
234 EIGHTH ST. HOLLAND, MICHIGAN

BUSS MACHINE WORKS

POWER PRESSES

WITH A *BIG* DIFFERENCE

NEW handy
Air-Draulic
POWER



Eliminates costly

PUMPS
MOTORS
RESERVOIRS
ACCUMULATORS

You Get **TOP PERFORMANCE FOR LESS**

A miraculous new source of power is at your command. Handy Presses of any size and capacity, hot or cold platen, with or without automatic timing are equipped with Air-Draulic Power tailored to your precise needs. Air from an ordinary compressed air line is, by the Air-Draulic unit, converted to the required hydraulic high-pressure. Holding under pressure is accomplished without cost, operation is utterly simple and maintenance virtually nil.

Lower in original cost, Handy Air-Draulics eliminate high installation and maintenance costs, and assure you of unfailingly perfect power for highest production at low operating cost. Power presses are now within the reach of every plant. Write—

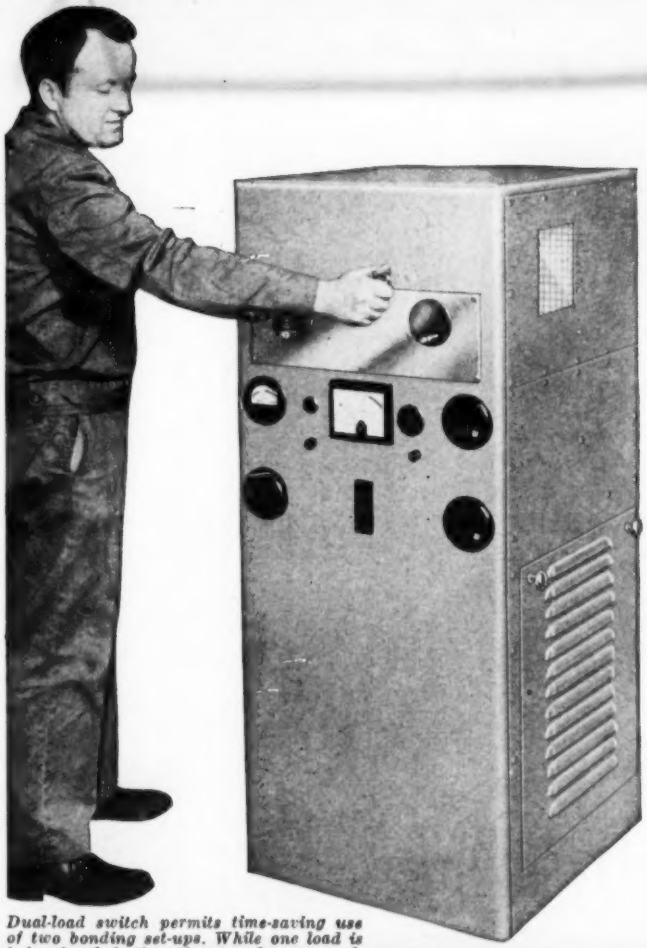
Above is a Handy No. 826 Air-Draulic Hot-Platen Scarf Joint Bonding Press with thermostatically controlled electric heat and automatic cycle timer. It is a champion producer of large plywood walls from stock-size panels for freight cars, housing, boats, trailers and military materiel.

HANDY MAKES PRESSES for

VENEERING, LAMINATING, SCARFING, OVERLAYING, PANEL-TO-FRAME BONDING, EDGE-BANDING, BENDING, MOLDING, FORMING with Air-Draulic, pneumatic, hydraulic or screw power

HANDY Manufacturing Company

2436 WEST LAWRENCE AVENUE • CHICAGO 25, U. S. A.



Dual-load switch permits time-saving use of two bonding set-ups. While one load is being bonded, the other can be prepared

Thermex

ELECTRONIC BONDING EQUIPMENT

NEW! compact

portable unit

for many bonding jobs

THERMEX Electronic Bonding Equipment for:

EDGE-BONDING OF LUMBER
MOLDING OF LAMINATED PARTS
BONDING PANELS-TO-FRAMES
FABRICATION OF ASSEMBLIES
BONDING OF PLYWOOD.

YOU'LL find the new THERMEX 3-kilowatt Bonding Equipment (Model 3H) a versatile performer on a variety of small bonding operations.

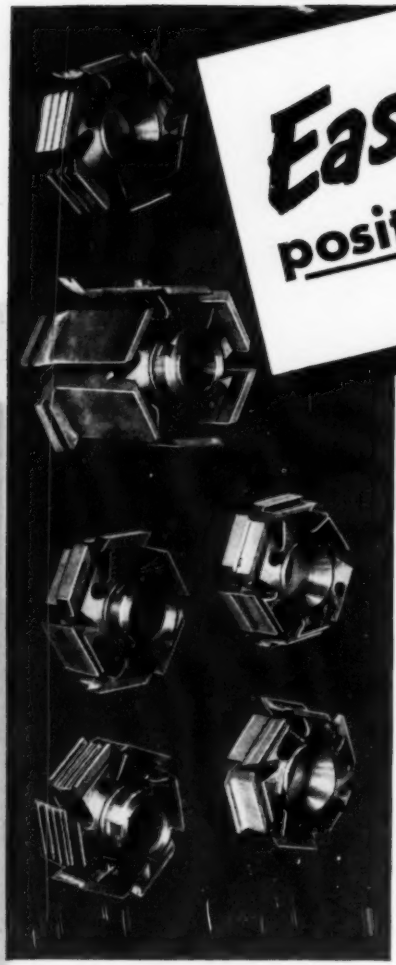
It's well insulated—a new construction reduces escaping radiation to far below the legal maximum. Each unit is certified in accordance with FCC regulations.

It's dependable . . . installation by Thermex factory engineers assures satisfactory operation from the start. All parts accessible for easy servicing.

THERMEX users everywhere report reduced labor requirements, boosted production. A THERMEX field engineer will be glad to study your operations and make recommendations—at no obligation. Write The Girdler Corporation, Thermex Division, Louisville 1, Kentucky.

THERMEX—T.M. Reg. U. S. Pat. Off.

THE GIRDLER CORPORATION
Thermex Division

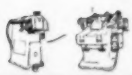


Easy set-up . . . positive alignment

• Diehl's complete line of standard cutter heads includes a wide variety of vice grip heads. Diehl vice grip heads are easy to set up, give positive alignment, and have greatest gripping power for retention of dovetail cutters. A few of them are illustrated, both with and without Diehl's self centering sleeve. Diehl vice grip heads are safer and more satisfactory for heavy cuts and high frequency spindle speeds. Diehl heads are rugged . . . they *stay* on the job!

And if your job requires special heads, Diehl can design and build them. Diehl can meet *your* cutter requirements. Ask for our latest cutter catalog.

CUTTER DIVISION



On the Banks of the Wabash

THE G. M. **Diehl** MACHINE WORKS, INC.

WABASH, INDIANA • U.S.A.

The Double Thread Cuts the Time

in Half!

Can be furnished with either Slotted or Phillips recessed head

Save assembly time . . . . . get better fastenings with the TWIN-fast Screw's four exclusive advantages

1. Twin thread doubles the pitch . . . drives the screw twice as far for each turn of the driver.
2. Centered point helps make fast, straight start—no wobbling of screw, no displacement of parts.
3. Relieved shank eliminates "wedge action" and splitting—makes stronger fastening.
4. Parallel sides (no taper except at point) gives greater contact—often allows fewer or smaller screws.

you can identify TWIN-fast by its twin threads centered point relieved shank parallel sides

save TIME
save DRILLING
save SCREWS
save REJECTS

when assembling wood to wood, plastic to wood or metal to wood

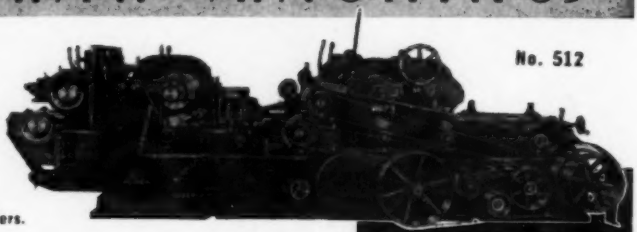
TWIN-fast

Reg. U. S. Pat. Off.
2,314,291 — 2,314,300 — 2,373,378
2,373,948 and 2,403,106

The Faster Driving . . . Cost Cutting Fastener

NEWMAN MACHINES

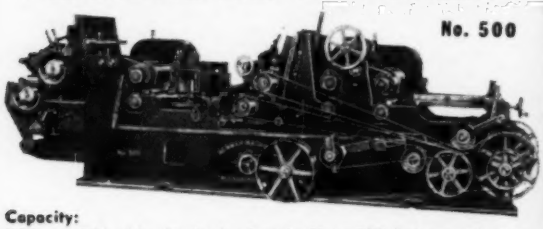
Newman



No. 512

Capacity: 16" and 24" wide, 8" thick.
Speeds up to 325 feet per minute.
8" dia. cutting circle.
Six 12" dia. feed rolls.
Single and double profilers.

BALL and ROLLER BEARING PLANERS AND MATCHERS



No. 500

Capacity:
14" and 24" wide, 6" thick. Speeds 40 to 200 feet per minute. 7" cutting circle. Six alloy steel feed rolls. High carbon special alloy steel cylinders. Single or double profilers.

The ball bearing NEWMAN 71 (shown below) will grind all sizes of cutter heads. Table is 33" long by 9" wide with horizontal travel of 25" and is heavily ribbed to maintain accuracy over entire travel. Maximum cutter head swing is 11".

HEAD GRINDER No. 71

ORDER NOW FOR EARLY DELIVERY

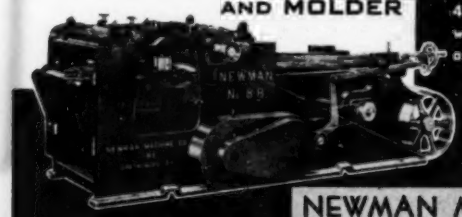
ALL NEWMAN cylinders or heads are DYNETRICALLY BALANCED insuring an accurate and superbly finished product.

Ball and Roller Bearings

No. 55 AUTOMATIC PINEAPPLE FEED TABLE

The NEWMAN 55 feeds stock automatically to high speed planers and matchers up to 450 lineal feet per minute. Capacity: 30" wide, 8" thick. All adjustments and controls are centrally and conveniently located.

No. 8-B PLANER, MATCHER AND MOLDER



The NEWMAN 8-B planes 22" wide and 8" thick, joints 4" thick and will match 14" wide. 6" diameter feed rolls. Speeds of 30, 50 and 75 feet per minute.

Unsurpassed for work in small and medium mills

MAY WE SEND YOU FULL DETAILS?

NEWMAN MACHINE COMPANY, INC.
GREENSBORO, NORTH CAROLINA, U.S.A.

When you call in a National Casein factory-trained glue specialist to help you—you can count on "Casie" or "Resie" to come up with a practical solution to *any* glue problem you may have—little, BIG or *TOUGH!*

Nearly 35 years of working with casein and resin formulas for every kind of glue application, under practically any combination of working conditions, makes it possible for National Casein to help you keep your production up—your glue costs down—your customers satisfied.

Outline on your letterhead any adhesive problem you may have. We'll submit a sample solution, FREE and without obligation.

National Casein

No Glue Problem—Casein or Resin—is too Little, too Big, or too Tough!

605-19 West 80th Street, Chicago 20, Illinois • Broad & Fulton Sts., Riverton, New Jersey

No. 4 of a series depicting method for perfect wood finishing with Sundstrand Sanders

Sealer Sanding for a perfect blemish-free surface with a Straight-Line Action Sundstrand Air Sander

In one easy operation, the Sundstrand Air Sander completely removes orange peel, pock and dirt from sealer. Gives you a blemish-free base ready for final finishes. Here, just as in every other step in fine wood finishing, you'll find that the *Straight-Line Action* Sundstrand Air Sander does it better, smoother, faster. Contact your local supplier or write today for bulletin WW-8 containing useful wood-finishing information.

SUNDSTRAND

SUNDSTRAND AIR SANDERS

SUNDSTRAND MACHINE TOOL CO.

PNEUMATIC DIVISION, ROCKFORD, ILLINOIS

NOW! *a phenol-modified adhesive*

that equals a straight resorcinol adhesive

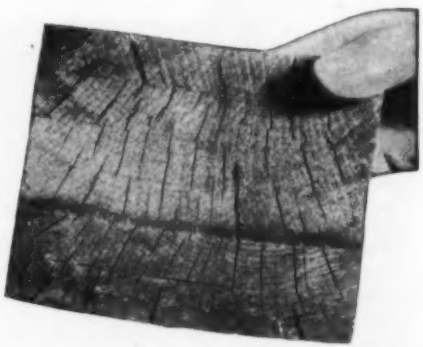
. . . COSTS 25% LESS!

PENACOLITE® ADHESIVE G-1260

● Now . . . just in time to alleviate the critical shortage of resorcinol due to extraordinary demands for defense needs, the originators of Penacolite resorcinol resin adhesives have developed a new phenol-modified adhesive. It is comparable to straight resorcinol adhesives . . . and costs ¼ less! This is Penacolite Adhesive G-1260, a two-component resorcinol-phenol formadehyde resin adhesive capable of curing at room temperature and providing strong, waterproof bonds. The use of this modified formulation means a saving of nearly half the scarce resorcinol that would otherwise be required—an important consideration in view of NPA's restriction on resorcinol.

Penacolite G-1260 bonds will not deteriorate with age. And they're unaffected by molds, fungi, grease, most organic solvents and acids. The durability of this economical adhesive has been *proved* through gruelling Vacuum-Pressure Cycle Tests under Specification JAN-A-397.

Penacolite Adhesive G-1260 will provide strong bonds between wood, treated woods, many plastics, natural and most synthetic rubbers, primed metals, and porous materials such as paper, leather, textiles, plaster, cement, fiberboard, and asbestos boards. For defense work, call the Koppers Chemical Division office nearest you and arrange for a supply of this durable, money-saving adhesive. And remember: our technical service is always at your call.



This photo shows a block of Penacolite-bonded, laminated wood after it was subjected to the 21-day Vacuum-Pressure Cycle Test. The *wood* checked . . . but the *Penacolite joints* held!

KOPPERS COMPANY, INC.
Chemical Division, Dept. WWD-8
Koppers Building, Pittsburgh 19, Pa.

KOPPERS **PENACOLITE RESORCINOL ADHESIVES**

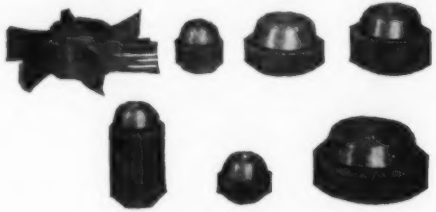
Save Up To 80% On Sandcloth Costs

*Patented

WITH THE PEARSON MODEL A SANDER*

Many plants have reported a saving of 60% to 80% on sandcloth in sanding irregular shapes with the Pearson Model A Sander. Motor shaft tilts from 0 to 90 degrees permitting head to fit beveled moulding angle perfectly. Sands one or more stepdowns at the same time eliminating several costly operations. The sanding of inside radii of circles and very flat tapered moulding is another cost saving feature of the Model A Sander. It is one of the fastest and most efficient sanders for irregular shapes on the market today.

Standard equipment includes 7 metal heads and 14 cushions made of the finest grade rubber. Length of cushions range from ¾ to 4 inches; outside diameters, 3¼ to 7 inches. With the Pearson Belt attachment, the Model A can be converted to an all purpose sander at a small additional cost.



Faster, Smoother Sanding With The Pearson Block and Edge Sander

Sands straight mouldings and round corners in one simple operation. Belt can be removed and by attaching Pearson (Patented) metal heads, this versatile sander can be used as a "straight-up" spool sander. Motor can be raised (or lowered) up to 4 inches. Equipped with 1½ H.P. motor, 4 and 6 inch drive pulleys, belt, and Gregory Butt Block complete with felt cushion shaped to fit any one mould. Length of belt is 19 feet; table 22 inches wide. Overall length is 11 feet.

WRITE FOR FULL PARTICULARS TODAY

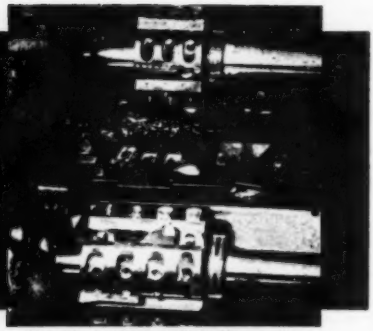
Also manufacturers of Waterfall Belt Sanders and Grill Sanders

PEARSON SANDING MACHINE CO., INC.

HIGH POINT, N. C.

Another Weyerhaeuser Mill where

DISSTON Philbrick CUTTER HEADS



Mounted pair of Disston Philbrick Heads used by Weyerhaeuser Mill to run 4" crown moulding.

are

PREFERRED FOR PRODUCTION RESULTS!

Rough stock being fed into planer. Disston Philbrick Heads pull easily, cut smoothly, and take faster feeds because they are precision-ground, dynamically balanced.

Grinding room photo showing Disston Philbrick Heads regularly used at Weyerhaeuser Timber Company's Newark, N. J. Planing Mill.

From the rolling woodlands of the East Coast to the giant forests of the West, the name Weyerhaeuser stands for modern and progressive lumbering operations. And here, in the Newark, N. J. planing mill—as in other Weyerhaeuser plants from coast to coast—the cutter heads preferred for top quality, high-quantity production are Disston Philbrick!

Wherever lumber is planed or moulded, you'll find Disston Philbrick Generated Type (milled-to-pattern) Heads. These are heads specially designed for accurate trouble-free work: Each pair of heads can work a wide variety of patterns. Knife changes are quick and simple—no holders, clamps, or gibs! Specially heat-treated alloy heads last longer, run smoother without vibration or chatter because they are *dynamically balanced*. And the Disston Philbrick knife-and-head designs permit faster feeds and heavier cuts. Why not put modern Disston Philbrick Generated Type Heads to work in your plant. You'll get finer quality output, more footage on less investment, and lower operating costs!

Disston "Cutting Angles"—a new cutter head service bulletin for the woodworking industry—contains helpful information on improving quality and cutting costs in planing mills. If you'd like to receive it regularly, write on your letterhead. Also FREE wall chart for planing mills showing standard woodworking patterns.

FIGHT WASTE

"SCRAP TURNED IN...IS STEEL TURNED OUT!"

Steel mills urgently need more scrap *now*. You can help by keeping your steel scrap moving into channels serving steel mills.

HENRY DISSTON & SONS, INC.

895 Tacony, Philadelphia 35, Pa., U.S.A.

***Pacific Coast Factory:* Seattle, Wash. • *Canadian Factory:* Toronto 3, Ont.**

Amazing Bottleneck Smasher for Wood Gluing Departments

Thermatron Offers a Complete Engineering Service, Too!

The picture is complete when THERMATRON—under one contract *and one responsibility*—supplies the electronic equipment, presses and "know-how" in your wood gluing department. Eliminate the bottleneck for faster, better, more economical production!

THERMATRON will analyze your product and production, recommend the generators and jigs to carry the load, supply them custom built, if necessary . . . But we don't stop there! The production set-up, including adequate power and air supply, adjustment of jigs, instruction of your factory personnel . . . all these are important links in the chain of THERMATRON service. Maintenance service, too, is available on short notice.

We'd like to discuss your wood gluing problems with you. Whether you are interested in initiating an electronic bonding installation—or whether you are in need of information concerning existing equipment, THERMATRON engineers are at your disposal for consultation without obligation. Write us now, and also request our new bulletin WD-5.

Thermatron

HIGH FREQUENCY GENERATORS AND EQUIPMENT FOR ELECTRONIC GLUE DRYING • BENDING ELECTRONIC EDGE GLUING • VENEER BONDING

Standard stock generators available from 500 watt to 20 KW output, operating on 110 or 220 volts. Larger size generators up to 100 KW can be supplied for larger requirements.

Thermatron DIVISION

RADIO RECEPTOR CO., INC.

Since 1922 in Radio and Electronics

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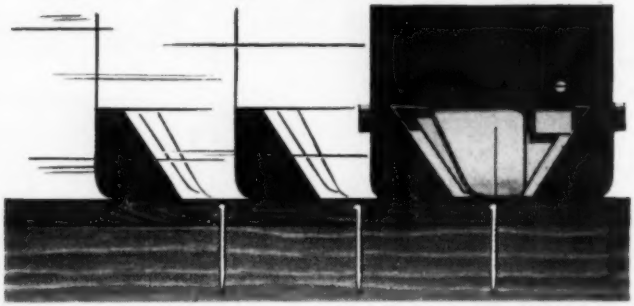
FACTORY: 84 NORTH 8TH STREET • BROOKLYN 11, N. Y.

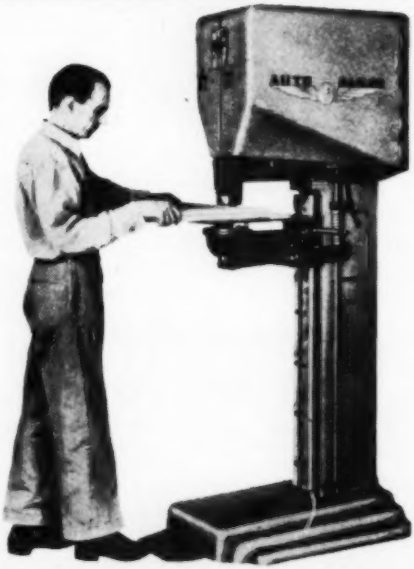
If It's Speed You Need



You need an AUTO-NAILER

Television Cabinets • False Fronts • Banding • Seat Bearers • Skids • Crates • Luggage Valances • Molding • Umbrella Ferrules • Picture Frame Sprigging • Eliminating Clamps on Glue Joints • Starting Nails • Hinge Pinning • Toys • Novelties • Metal "T" Molding • Nailing Masonite PRESDWOOD • Upholstered Furniture Frames . . .

Auto-Nailer does the work of from 3 to 5 men hand nailing. It puts out more work . . . faster . . . better. Auto-Nailer makes, drives and sets 3 nails a second—in all materials. No nails bent, dropped—no work split—every nail becomes a part of the product. Has quick, accurate settings for nail length and countersink.



TWO MODELS.
SPARTAN, for heavier work;
CRUSADER, for lighter work.

SEND US SAMPLES OF YOUR WORK FOR NAILING — NO OBLIGATION.

WRITE FOR FREE CATALOG

AUTO NAILER

THE AUTO-NAILER CO.

267 MARIETTA ST., N. W. • ATLANTA, GEORGIA

SALUTE

to the South

If the rest of the country isn't aware of the fact already, the south central states are aggressively endeavoring to improve their business and living conditions. They are doing a creditable job of it, too. In so far as the woodworking industry is concerned it means that more and better finished wood products are being made from the large quantity of raw materials that are available. Furthermore, the south central states are carrying on an intelligently directed fight to regain some of the wood products markets partially lost to metal and other materials.

Naturally, these manufacturers were interested in finding out why the recent "furniture markets" were not more successful. A number of things, it is felt, contributed to this situation. Some that could be remedied. Others that were the effect of conditions beyond control, such as the war situation, could not be taken care of at this time.

Briefly, here are a few suggestions on what might be done to help matters, recognizing the fact that retailers' stocks are unbalanced. Get the best sales representation obtainable; concentrate on manufacturing those items that are easiest to sell and replace the "stickers" with low priced, but not low quality items. With regard to the last, give utility consideration in designing. If possible, develop combination-use numbers that will fit better into the type of housing and living we seem to be establishing.

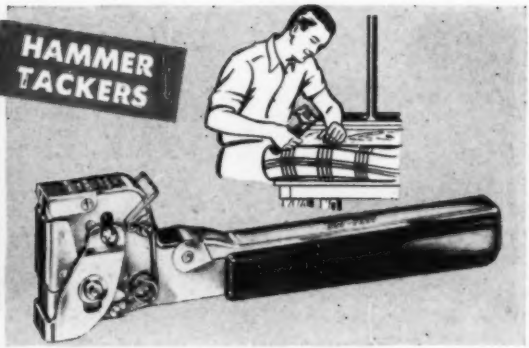
The belief down south is that business will be better—much better—this fall than it was this spring because more people are being employed at higher incomes. Unless some catastrophe happens, crops and business generally will be better too.

Ned Bailey
Editor-in-Chief

DUO-FAST

TACKS BETTER QUICKER

HAMMER TACKERS



MORE WORK, in less time, using fewer workers—that's the story on Duo-Fast Automatic Tackers.

AIR TACKERS

WIDELY USED in cabinet and woodwork shops, furniture plants, sash and millwork factories, toy makers, for a wide variety of tacking jobs.

A COMPLETE LINE 85 models available including AIR TACKERS, HAMMER TACKERS, GUN TACKERS, and STRIKE TACKERS. Line includes the one to save you time and money.

GUN TACKERS

DUO-FAST FEATURES all steel construction for long service—Jiffy Jaws for easy cleaning —fast back-end loading—positive driving action—important Duo-Fast Free Service Guarantee.

50 Sales & Service Offices in Principal Cities

WRITE TODAY FOR YOUR COPY OF THE DUO-FAST CATALOG & PROFITABLE SUGGESTIONS

FASTENER CORPORATION
858 Fletcher Street • Chicago 14, Illinois

Pointed Paragraphs

Competition within the plywood field is indicated, not between companies so much as between materials, by the fact that an industry committee of NPA is gathering data on production potential with the purpose in mind of recommending to the government a broadening of specifications, now calling for softwood plywood and allow for interchangeability of the two types. At present no federal restriction or limitation on hardwood plywood is being considered.

Don't let any Korean truce confuse your thinking about preparedness. Unless congress and the president do a complete right-about-face the defense program will go ahead as scheduled. Mobilization Chief Charles Wilson wants to complete the program by the middle of 1953. Consumer durables production will no doubt level off now at the present rates and continue the same for the balance of the year.

We are informed by Uncle Sam that trips to Washington on NPA matters are not necessary. We are told that the nearest U.S. Dept. of Commerce NPA office is now prepared to assist you in any way it can.

An industry development that is bound to favorably affect our business is seen in the somewhat sudden rise in shipbuilding. The Shipbuilders Council of America says there are an aggregate tonnage of new bottoms of some 678,000 tons. For the same time last year—the first quarter—there were only 460,302 tons.

We have been mentioning both built-in and dual purpose furniture. Have you talked to any of your local home builders about what you could do for them in this regard? There is a growing demand for these items all over the country.

Mark up September 24-27 to attend the annual convention of the National Hardwood Lumber Association in Chicago, if you can.

new **Kirk & Blum Dust Control System**

"FAR SUPERIOR"

... SAYS THE WEIMAN COMPANY, ROCKFORD, ILLINOIS

Call on K&B...for all Three

DESIGN ... FABRICATION ... INSTALLATION

Just one contract, one responsibility for a complete, ready-to-operate system guaranteed to do the job right!

Individually tailored to this plant's specific requirements, the new Kirk and Blum Dust Control System is "doing a very efficient job. It is far superior to the old type", this famous firm reports.

If all dust control problems were alike, it would be a simple matter to buy stock components, install them yourself and have efficient dust control. But it's not that simple. Requirements vary widely, depending on plant layout and operations. There is not and can't be a "recipe book" solution of dust control.

That's why plants, large and small, have found it pays in greater operating efficiency to have a dust control system designed, fabricated and installed by experts. Kirk & Blum, with more than 43 years, has the experience and skill to serve you.

For complete details on representative installations, write today for catalog W, "Dust Collecting Systems for Woodworking Plants". Address: The Kirk and Blum Mfg. Co., 3120 Forrer St., Cincinnati 9, Ohio.

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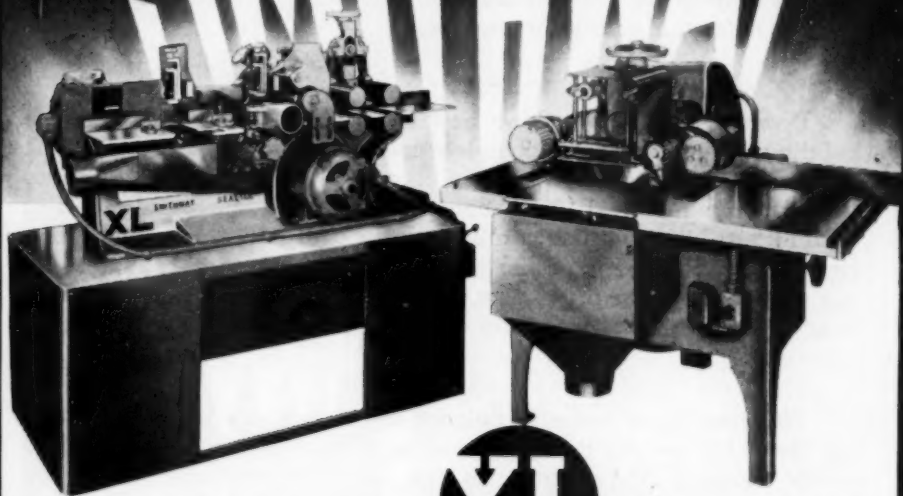
DUST CONTROL SYSTEMS

BIG LEAGUE TEAM

SMITHWAY



MOLDMATCHERS XL RIPPERS

While you are reading this ad nearly 2,000 XL Moldmatchers in all parts of the world are producing moldings of all descriptions from quarter-round to novelty siding. A production machine in every sense of the word. Makes satin smooth precise moldings.

Available in 2"x4" and 2"x6" capacities. Economical to buy, operate and maintain. Modern space-saving design. High speed ball bearing. Infinitely variable feed speeds.

Self-feed ripsaws of the most modern design. Made for fast accurate production. Unbelievable performance on any job. Available in 10 and 20 h.p. sizes. Rips stock to 4" thick. Feed speeds 50 to 190 f.p.m. 8" saw arbor for gang ripping. A machine whose performance has been proven in shops all over the nation.

Write for full specifications.

If you work wood YOU NEED AN XL

SMITHWAY MACHINE COMPANY

MANUFACTURERS OF *XL UNI-STEEL KNIVES* FOR THE XL MOLDMATCHER

4617 AIRPORT WAY, SEATTLE 8, WASH.

ENGINEERED FOR TOMORROW

The number of articles in this issue refering to gluing is not accidental, but carefully planned. See the finishing section, equipment and supplies, as well as our several feature articles scattered elsewhere throughout the book. Gluing and proper bonding techniques are important items and can be the cause of all kinds of trouble, or can be a real help in speeding up production and maintaining high quality. Any of our advertisers who manufacture adhesives will be glad to help you with your problems.

Down in Texas something new is attracting the attention of the building industry. It is a complete millwork shop on wheels. R. E. McCaskill of Dallas built the shop on a 24'x7' flat-bed trailer. On the trailer he has mounted 10 stationary power tools, 15 portable tools in steel lockers—all of which can be covered over and made waterproof. He has included, among other equipment on the trailer, a jointer, tilting table and tilting arbor saw, band saws, drill press, planer, disc sander, shaper, cut-off saw and a router.

This item more properly belongs in the Industry Notes section of our book, but we are going to mention it here instead. E. L. Bruce recently received ECA's certificate "for furnishing technical assistance to the peoples of Marshall Plan countries to aid them in maintaining individual liberty, free institutions, and peace." Congratulations, Mr. Bruce!

Bigger and better homes are the order of the day, in fact have been for some time. From the Bureau of Labor Statistics, a reliable source, comes interesting data in this regard. During the first quarter of 1951 floor area of 60% of the homes built covered over 1000 square feet, which in a like period in 1950 only 40% of them covered that much. In 1951 a fourth had more than one bathroom as compared with either '49 or '50.

Average cost of homes rose from $9,215 ('50) to $11,765 ('51). Only a small amount of this increase is attributable to increased wages and materials cost. House trailer production to date for '51 is more than 15,000 units above last year.

a New

INVISIBLE METHOD OF WOOD FASTENING

BURR-LOCK

DOUBLES STRENGTH OF WOOD JOINTS

Unretouched X-ray photograph showing BURR in wood joint

an IMPORTANT ANNOUNCEMENT

TO THE WOODWORKING INDUSTRY

Now you can build furniture, boxes, pallets, doors and a thousand other wood products stronger than ever. Just try **Burr-Lock** which is a multiple pronged steel ring that is INVISIBLE in the finished job. Use the rings with or without nails or glue . . . and when employed with nails or glue, you get what you always wanted—stronger joints.

EASY TO USE. Place the Burr between two pieces of wood, hard wood, soft wood or a combination (it makes no difference), and press or drive them together. That's all there is to it.

Burr-Lock is a new cost-saving invention designed after many years of research. If you are interested in an EXTRA SURE WAY to fasten wood parts securely, write us for Burr-Lock Folder No. 651.

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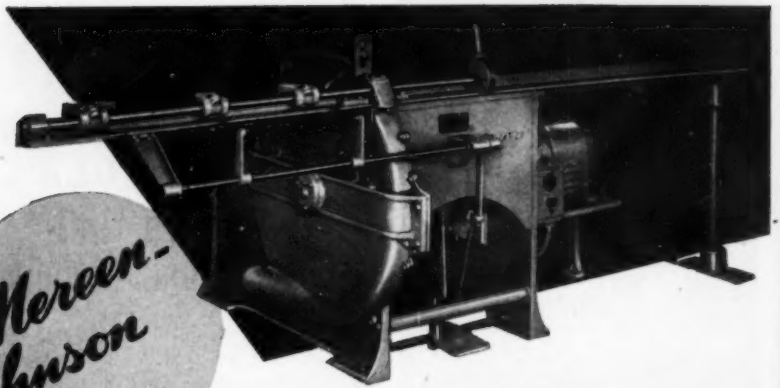

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AUTOMATIC CUT-OFF SAWS

The greater your production . . .
The greater the saving

THESE MACHINES have a capacity equal to two or three swing, straight line or roller carriage cut-off saws—depending on the condition of the stock. They are particularly efficient wherever short lengths are cut from long boards in quantity production. Two saws, mounted opposite from each other on a revolving yoke, make alternate cuts. Each saw disappears beneath the table as it cuts. The operator never has to wait for the saw to return to the back position, as is the case with an ordinary reciprocating type of machine. The stop lever at the operator's left hand leaves the right hand free to handle the stock. Two models: *No. 477, 17" wide. No. 478, 23½" wide.*

- **Ideal for any production cross-cutting operation**
- **Fewer machines save floor space, power, labor**
- **Includes new retracting stock support.**

write for Bulletin No. 477

COMBINATION UNIT

Automatic cut-off saw, gang rip saw and automatic hopper feed for gang rip saw. The stock leaving the cut-off saw drops onto the bed of the automatic feeder. This in turn feeds into the rip saw eliminating the off bearer of the cut-off saw and feeder of the gang rip saw. Note the saving of two men in this operation.

Mereen-Johnson MACHINE COMPANY

4401 LYNDALE AVENUE NORTH · MINNEAPOLIS 12 MINNESOTA

IMPROVING RADIO FREQUENCY EDGE-GLUING

Part 2

by E. S. Winlund

Electronics Engineer, Westinghouse Electric Corp., Hartford, Connecticut.

PROPERLY designed edge-gluing presses (a) facilitate stock layup with minimum manual effort and time, (b) hold the completed layup flat while (c) sufficient edge pressure is applied to obtain contact between all edges, (d) apply RF voltage across the glue line for a sufficient time to set good joints, (e) eject the glued panels while accepting fresh layups, all as automatically as practicable. The great majority of RF presses in use today do this on a batch basis; i.e., the stock comes to rest while RF is applied. Two or three makes have continuous layup tables (nevertheless batch heating) which save a number of seconds otherwise required for return of the feed ram. A few makes are truly continuous, RF being applied with stock in motion, under pressure, which considerably lowers the RF generator power requirement, and in some situations eliminates the need for board matching. But common to all types are these requirements:

Edge Pressure

High edge pressure is essential. No other design feature of a press has more bearing on the results.

Perfectly square and straight edges, with a uniform thin glue spread, of course require little or no pressure for an excellent bond. But the fact is that despite proper preparation of stock, it still is never perfectly square and straight, and only pressure can make up the deficiencies.

If the press is to be used for hardwoods, this means edge-pressures of the order of 150 to 250 psi, are desirable, and of course they are limited by the maximum thickness to be glued. Very wide and long hardwood boards (say 12 inches by 8 feet) may require the maximum. For softwoods, pressures of 150 to 250 psi. give excellent results. Good results are sometimes obtained with pressures as low as 75 psi., but in our experience this does not permit permanently dependable operation, except with soft, low-density species.

Uniformity

Uniform edge pressure is important. Some means must be provided to exert uniform edge pressure regardless of variable length and width of stock, slightly hollow edges and wedges. Actual fluid pressure is a theoretical ideal, but difficult to apply. Near-fluid pressure can be obtained using a number of close-spaced and relatively short pressure feet each individually or "double tree" activated by hydraulic or

pneumatic cylinders or springs, or by the use of face friction restriction against continuous broadside stock flow.

Presses for end-gluing must of course hold the pieces in proper alignment while RF is applied, but should require less end-pressure than edge-gluing because of the direction of the glue lines. In continuous presses it is particularly important that there be absolutely no relative movement between the two pieces being joined, though they may be travelling, while the RF is on. Experience has shown that the slightest relative movement after the glue has begun to polymerize will seriously reduce joint strength.

Layup Table

Layup tables should have maximum time availability. Layup tables are located just ahead of the press, with the glue spreader "wet" conveyor usually running conveniently a foot or two above them. Most batch presses have a feed ram at the end of the layup table, which, as soon as all boards have been laid in place on the table, shoves the whole layup into the press, and immediately returns to the head end to permit the next layup while RF is on. The table unavailable time (while feed ram is in motion) is usually the order of 5 to 8 seconds, compared to a 30- to 50-second total cycle. Batch presses using continuous feed tables instead of a feed ram cut the unavailable time to 3 to 7 seconds. Fully continuous presses of course cut the unavailable time to zero.

Reload Factor

Press reload time must be minimized. Reload time is defined as the total time between RF heats. The total press cycle time is the sum of RF heat and reload times, and divided into 3600 seconds gives the production in press loads per hour of steady operation. Most batch presses have reload times of the order of 8 to 20 seconds. Only a small part of this (the layup table unavailability time of 3 to 8 seconds) is actually lost time for the operators, but the reload time is idle time for the generator and press. Therefore reduction of the proportion of reload time to total cycle increases the production capabilities of a given generator and press size.

Care of Equipment

Cleaning and maintenance must be considered. Most edge-gluing installations seem to get about seven hours of steady production out of an 8 hour shift. The remaining hour is used for cleaning glue off the glue spreader conveyor, mixing glue, handling falldown due to bad stock, etc., and miscellaneous timeouts for the operators. About half a crew can handle cleaning and mixing in this time.

Cleaning of the press itself seldom presents a problem in batch presses. In ram-feed types there is constant scraping of the electrodes by the lumber, and what is left at the end of the shift dries to a film which is easily peeled off in a few minutes when operation is resumed.

Unless unusual provision is made to dry squeezeout at the press, electronic presses generally leave a small amount of wet surface glue on each glued panel, because the relatively cool electrodes conduct away any surface heat developed in the glue by the RF, before its temperature can rise very far. The electrodes of thermally-insulated staggered-electrode presses, however, soon get hot enough to leave a negligible amount of wet surface glue. If wet glue is excessive, stacking sticks may be used between panels of the offbearer, but a pinch or two of sawdust has also been found very practical.

Shielding

The Federal Communications Commision has established regulations which limit the permissable radiation

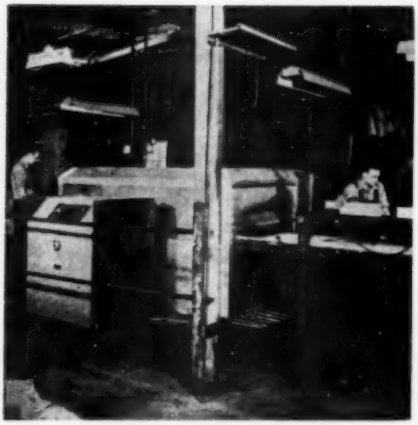


Fig. 7. A typical well-shielded and certified RF installation.

(i.e., broadcasting) from any industrial RF equipment to protect against interference with radio communications such as aircraft, police, fire, industrial, broadcasting, etc., and has set a time within which all present installations must comply.

Proper shielding of a new installation is not difficult, nor expensive, and is quite practical for edge- and end-gluing. We work with the press manufacturer on shielding as well as general design and coordination with the RF generator. The complete equipment is then "type-tested" to make sure radiation complies with FCC regulations, and each subsequent user of that design is given a certificate stating that it complies with the FCC regulations.

Fig. 7 shows one view of a typical well-shielded and certified installation, that of an Earle Hart press at Caswell-Runyan in Goshen, Indiana.

Adequate shielding is not merely a matter of metallic enclosure of the press, but requires a special technique acquired solely by experience. Uncertified installations should be inspected by a competent electronics engineer, to determine whether they may be patched up to meet FCC regulations without excessive expense. Engineering assistance is available for this purpose.

Electrode Design

Electrode design depends upon application. Virtually all electrodes for edge-gluing are either staggered or solid, as shown in Fig. 8, and both have their advantages and disadvantages.

Staggered electrodes deliberately set up less than the full glue-line area, because of the criss-cross heating pattern, the remainder setting up within minutes or a few hours after removal from the press. When less than the full area provides adequate strength to hold the boards together, the job is thus often accomplished with somewhat less power for the same time, or in less time with the same power, compared to solid electrodes.

Solid electrodes, of course, set all of the glue-line area, leaving none to be set up after removal from the press. If for any reason it is considered that maximum strength is needed prior to release of pressure, then solid electrodes are desirable and corresponding power and time are required to do the job. Both staggered and solid electrode presses are in wide use for edge-gluing.

The series air gaps shown in Fig. 8 should be avoided whenever possible. Small air gaps encourage arcs if the system is operating near maximum safe voltage, and larger air gaps usually lead to critical tuning and generator instability. The result of an air gap, in any case, is to increase the necessary heating time.

It is now well-recognized that sharp electrode corners must be avoided. Fig. 8 shows the excessive crowding of flux lines at sharp corners, with corresponding high voltage gradients and tendency to arc.

The great majority of edge-gluing installations operate with one electrode

grounded and the other "hot" (RF voltage to ground, not temperature) because it usually simplifies the generator, coupling and adjustments. The RF current flows not only from the hot to ground electrodes through glue-line and wood, but also, as shown in Fig. 9, through space to the surrounding grounded components of the press. The resulting field is distorted at the electrode edges as shown by the very approximate field flux lines drawn in. These lines also represent current flow; the closer together they are, the more current there is, and therefore the greater the temperature rise.

It is at once apparent that (a) there is uniform current and therefore uniform temperature rise at the center area, (b) less temperature rise at the edges than at the center, (c) less temperature rise near the ends of the grounded electrode than the hot one, and that (d) the greater the electrode overhang, the better the temperature uniformity.

As a working rule, therefore, the electrodes should be arranged so that they always overhang the load by at least its thickness, and preferably twice that. This is a very simple matter for conventional edge-gluing, and results in excellent uniformity whether the system is fed push-pull or grounded.

For very wide glue lines, such as encountered in the lamination of arches and trusses, this effect must be carefully taken into account. For example, if the electrode spacing is 6 inches and the electrodes are only 12 inches by 12 inches in area, there will be such serious field distortion that much more heat will be developed near the hot electrode than near the ground electrode.

A partial improvement for very wide glue lines is to use push-pull electrodes (both hot, 180° out of phase) with the result indicated in Fig. 10. It

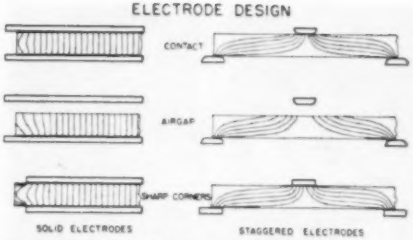


Fig. 8. Electrode design.

is as if a phantom ground electrode had been inserted at the dotted line, with the result that the distortion extends only half as far back between the electrodes as it did with one grounded. Push-pull electrodes may be fed either from a push-pull generator (called "double ended" by its manufacturer) or by a coupling circuit from a standard grounded-output generator.

The use of push-pull electrodes for wide glue-lines is not necessary, however, if the electrodes are made to overhang the load properly; with adequate overhang the heating will be the same near either electrode.

It might be mentioned that as a matter of interest that by judicious adjustment of one or more of the factors (a) electrode size (deficient overhang), (b) electrode shape, (c) subnormal generator power and (d) above-normal generator frequency it is possible to spot a point or plane of maximum heat at virtually any desired location between the electrodes.

Electrode Material

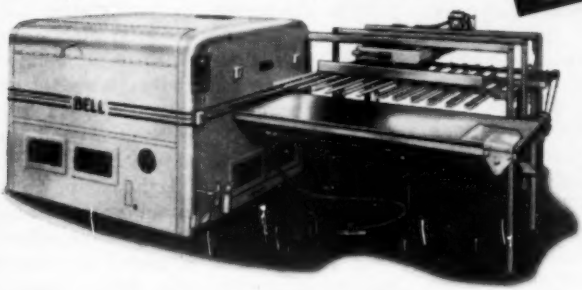
Electrically almost any non-magnetic metal is suitable for electrodes. Copper has the desirable high conductivity, but stainless steel is quite adequate for the purpose, and is perhaps most often used because glue does not tend to stick to it, and occasional arcs do not melt it too easily. Brass is often used. Aluminum is excellent electrically, but arcs eat through it very quickly.

Just push a button... the "300" gives you

Perfect Bonding Every Time!

PRESSURE
1
Automatic cycle begins with air pressure applied to top and sides of batch.
"BREATHER"
2
To correct "locking" of uneven stock top platen raises, allowing full side pressure.
PRESSURE
3
Warped stock is held flat . . . heat from solid platens cures glue in entire panel.
RELEASE
4
Cured panel is forced out by next batch, ready for immediate machining.

THE Bell No. 300 Electronic Gluer is designed to take care of problems *automatically!* Its short "breather" (see panel 2) takes care of variations in thickness . . its pressure points allow for variations in panel width . . . and it has the only dielectric generator with automatic tuning! The result: consistently good joints, uniformly bonded. Visit the Bell Machine Company and see the "300 demonstrated, or write for literature.



Twice the Diameter . . 4 Times the Pressure!

Equalizer yokes insure even pressure.

BELL WOODWORKING MACHINERY

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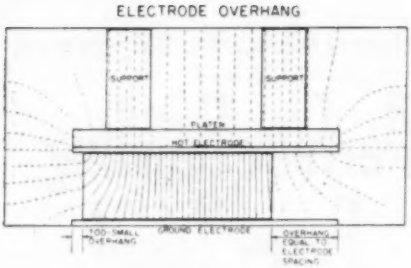


Fig. 9. How electrode overhang affects uniformity of heating.

Insulation for the support of electrodes must be chosen and designed carefully, keeping in mind that if RF heats it at all, successive press cycles will keep adding Btu's until it may get too hot and char or blister, causing an arc through it and consequent failure. At the frequencies used for edge gluing, ceramics and glass-bonded mica (Mycalex, Mykroy, etc.) are almost perfect insulators, but expensive and not generally necessary. The phenolics (Micarta, Bakelite, etc.) are not as good insulators, but usually quite adequate if voltage gradients in them are kept low and across the laminations, and adjacent sharp metal corners (including bolt ends) are avoided. Hardboard may be used for thin panel applications. Well-dried and sealed wood is almost as good, and sometimes better than phenolics and is easier to work, but the same voltage gradient precautions are necessary. We recommend maple dried to one percent moisture content, sealed with a low-loss transformer insulating varnish.

Whenever practicable, it is helpful to introduce rubber or any other effective resiliency behind one side of the electrodes, so that the tiny air gaps formed by minor wood thickness tolerances will be minimized. This may permit an increase in voltage without arcs, and, therefore, a reduction of heating time.

End-gluing electrode design requires special consideration which is about the same for batch and continuous presses. Each of the three suggested types of electrode shown at the right in Fig. 5 may be used with any one of the three types of joint shown at the left, with varying efficiencies and results. The solid electrodes heat all of the wood and all of the glue, but the glue is electrically more in series with the wood than it is in parallel with it. The glue-line is so long (high resistance) that relatively less current flows through it from one end to the other. Consequently it is necessary for the RF to heat the wood much of the way up to setting temperature, the wood, in turn, heating the glue, the remainder being taken care of by the glue-line current. The result is a relatively poor efficiency, because so much power had to go into wood, requiring more power and/or more heating time. The joint, however, will be completely set up.

Feather edges, unfortunately, will not be set up with any electrode arrangement because of heat loss to cooler electrodes, unless they are maintained at an elevated temperature.

Strip electrodes for end-gluing will perform identically to solid electrodes, except that there will be unbonded areas between electrodes (later set up at room temperature), and there will be a generally better bond around the "hot" electrodes than the cold, due to the field distortion if the strip width is comparable to stock thickness. Wider strip widths reduce the latter effect. This arrangement is useful to reduce the power requirements and/or heating time, if the reduced joint strength is acceptable.

If glue on the electrodes is a problem, an air gap may be used with either solid or strip electrodes, but there may then be a moderate increase of heating

Accurate glue joints

. . . direct from the saw!

High speed rough sawing, or high speed precision accuracy in cutting straight and hollow joints, it's all one to the G. M. Diehl No. 750 Rip Saw.

For wherever it replaces other equipment, this massive, precision-built machine is setting efficiency and production records. The No. 750 incorporates all the proved features of its predecessors plus many improvements, such as wider tables, higher standard speeds and friction bearings throughout.

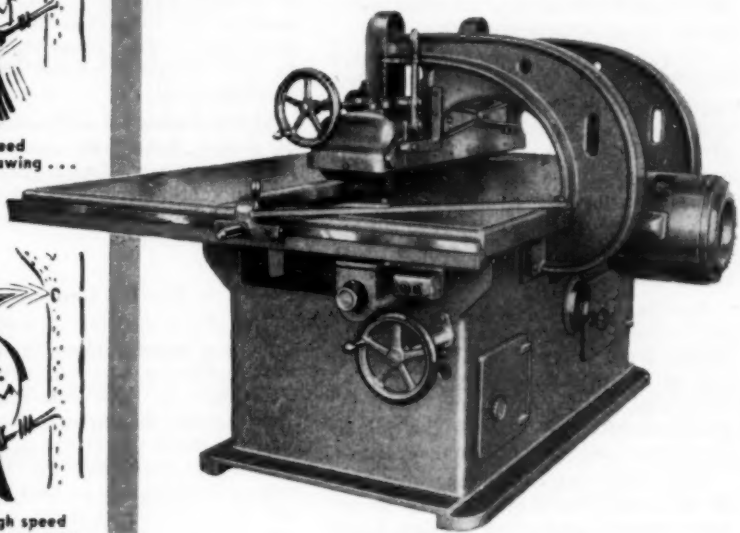
The massive welded base absorbs vibration. All driving equipment is protected from sawdust. The heavy pressure arms are capable of maintaining pressure with a 1500% overload, to assure positive precision at all times.

These are a few reasons why the No. 750 is becoming the standard in heavy-duty rip sawing, just as was its predecessor, the Diehl No. 75.

See your representative, or write the factory today, for complete details on how to obtain accurate glue joints direct from the saw—with the Diehl No. 750.

High speed rough sawing . . .

. . . or high speed precision accuracy



G. M. Diehl No. 750 Rip Saw

On the Banks of the Wabash

THE G. M. Diehl MACHINE WORKS, INC.

WABASH, INDIANA • U. S. A.

time to avoid arcs or to maintain generator stability.

Double-grid electrodes may provide better efficiency than solid or strip, because the glue-line path between electrodes is about the same length as the wood path. Most of the power at the joint accordingly goes into the glue line rather than into wood, the ratio of glue to wood per unit volume being much higher than for edge-gluing. In order for the current to flow through the glue lines, it must also flow through some series wood under each electrode, so that the amount of heat in the glue decreases with increasing distance from the nearest surface. When glue near the surface sets, however, its conductivity drops, allowing more power to go into deeper glue.

Air gaps cannot be used with double grid electrodes without (a) an efficiency reduction with most generators, and (b) a substantial increase in size of the unbonded (temporarily) area between opposed electrodes. For some situations these disadvantages may be offset by the mechanical advantages.

Other Facilities

Associated facilities may increase production. The production rate obtained from an electronic press, per day or per man, is greatly affected by associated equipment. One item already covered in detail is the jointer or ripsaw performance requirements.

Most batch presses require matching of the stock before glue-spread, to obtain approximately the correct layup width for the press and finished panel. At least one plant situation is such, however, that no pre-spread matching is done at all. The layup men match as they layup, not for final panel width, but only sufficiently to obtain pressure from the 4-inch stroke of the edge pressure feet in the press; this requires negligible time on their part.

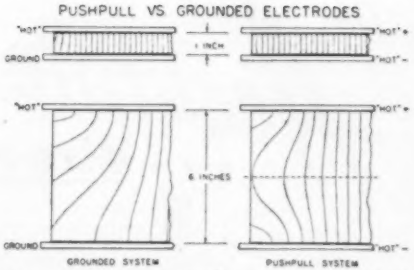


Fig. 10. Push-pull vs. grounded electrodes.

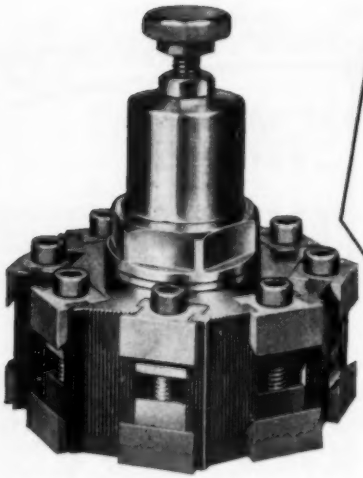
The offbearer then feeds the glued panels of variable width (within 2 inches to 3 inches) through a high-speed ripsaw equipped with a fence for proper panel size. Out of this offbearing rip come exactly sized complete panels, the excess being fed back to the original jointer to go onto another panel.

The principle of offbearing rip has, of course, long been applied to continuous presses. The incorporation of an automatic cutoff saw might be considered the primary feature of continuous presses.

The RF Generator

The RF generator is nothing more than a frequency changer which converts ordinary 60-cycle power to say 5,000,000- or 10,000,000-cycle power. Being about 50 percent efficient, only half the input power comes out as high frequency, the remainder coming out the cooling system as heat. As a matter of convenience, input voltages are 220 or 440, three-phase, and output voltages (for wood gluing) are adjustable in the neighborhood of 1,000 volts, single-phase. The output is still simple alternating current, identical with the input except that it alternates with the more times per second.

It is not generally realized that some glue-line heat, though infinitesmal, is obtained by putting ordinary 60 cycles,



CLAMP T-SLOT HEAD HCS-8

Shown without bits to illustrate design and action of clamps. Full cross adjustment provides for perfect alignment of various pattern bits. Available in 4, 6 or 8 Bit Styles.

The HEAD of its Class

Simple and rugged in construction . . . versatile in use . . . the BADGER Clamp T-Slot Head is used on today's finest moulders and matchers. With milled-to-pattern bits ground to your specifications, it is the Head of its Class for your production runs.

Full lateral adjustment, positive bit retention, and simple, straight-bevel face-sharpening provide assurance that patterns will remain true. Non-Perishable head-body of solid steel is built for years of heavy-duty service . . . through countless changes of bits. Consult Wisconsin for competent cutterhead counsel that will help step up the quality and quantity of your production.

CUTTER HEADS
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Engineers to the Woodworking Industry

WISCONSIN KNIFE WORKS

BELOIT, WISCONSIN

440 volts, across the electrodes. By using ordinary transformers we can raise the 60-cycle voltage across the glue line until at several thousand volts it will arc through. Even just before such an arc occurs, however, negligible heat is developed in the glue line because the wood is such a poor conductor of 60 cycles, and the glue line makes such poor contact with the electrodes, allowing negligible current to flow through the glue line, therefore developing negligible heat.

Now virtually all materials absorb more power (for the same voltage) as frequency is raised. Thus if we had means to keep say 1,000 volts across the electrodes while steadily raising frequency, we would find that the glue line and wood would absorb energy faster, in turn, causing their temperature to rise at faster rates. Hence, we use high frequency as a means of getting the glue and wood to absorb energy, without increasing the voltage.

The purpose of an RF generator, then, is to supply sufficient power at the right frequency and voltage, and nothing more. If it supplies the correct frequency and voltage across the loaded electrodes, but the bond is imperfect, the difficulty cannot be in the generator, coupling, or tuning circuits; they are doing their job. But let us review the desirable characteristics of a generator:

Power Output

Power output is determined by the pressload. Since a few generators are rated on power input, or Btu. output, instead of National Electrical Manufacturers' Association standard power output, one must always be careful to ascertain the power output rating of a generator, and to use that alone in calculations. Moreover a few generators are rated for intermittent duty, giving them an apparently higher power output. While most generators are

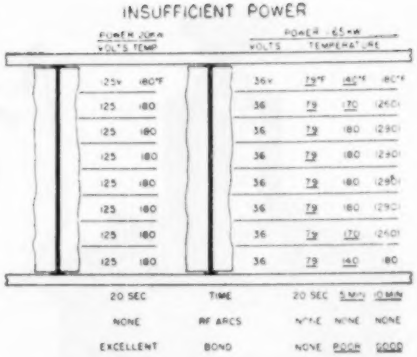

Fig. 11. Relation of power to time.

indeed used on intermittent duty, there are times when virtually all of them are used for long continuous periods, so it is much safer to use continuous duty power output ratings in calculations.

Table 3 shows a very convenient formula for calculating edge-gluing time or power requirements. It is universally applicable to conventional edge-gluing situations and appears to hold quite well for most special applications such as the lamination of trusses and arches, having been derived from production results on many installations of a number of makes and types. Because it lumps together a number of secondary effects such as those due to glue formulation, frequency, species, stock temperature, etc., it can only be approximate, perhaps within 20 percent. An example of the calculation is given in Table 4.

It is important to note that 4 percent is the minimum moisture content to enter in the formula, even though the actual moisture content may be lower. This is done because a further drop does not significantly reduce wood energy absorption.

Likewise, if the heating time, using the formula, calculates less than 15 or 20 seconds, a lower power should be

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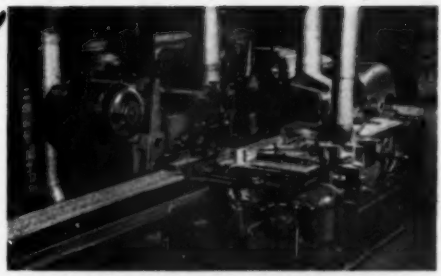
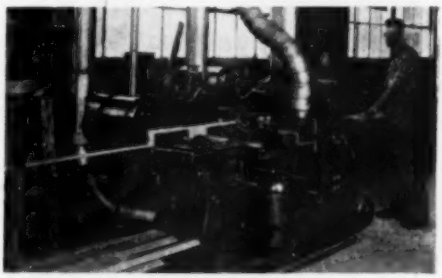


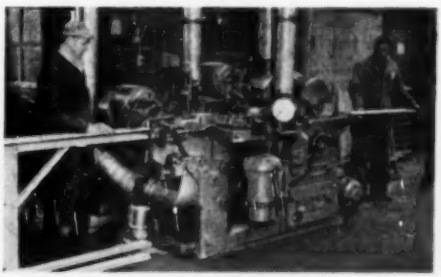
MARTINSVILLE, VA.

This is a 12" No. 468 ECCo Hi-Speed Moulder which is in constant use on a wide range of general millwork jobs.



SALT LAKE CITY, UTAH

Here an 8" No. 466 Hi-Speed Moulder is shown turning out one of numerous sticking jobs in a cabinet and fixture manufacturing company.



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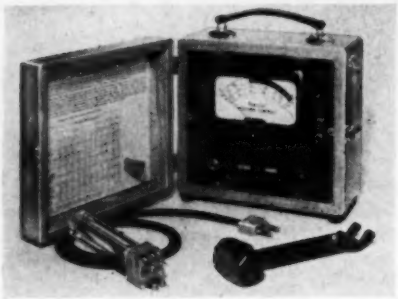

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TABLE 3. —HEATING TIME CALCULATION
PTA=18G+MW

P=Power, generator output, kilowatts
T=Time, heating, seconds (15 to 20 minimum)
G=Glue-line area, square inches
M=Moisture content of wood, percent (4 min.)
W=Wood volume, cubic inches

	Press:	Batch		Continuous	
	Electrodes:	Stag-gered	Solid	Stag-gered	Solid
A= Softwoods:		100	80	94-118	94
A= Hardwoods:		56	44	52- 65	52

used to obtain a longer time. Times below 15 to 20 seconds will nearly always dry the glue, but they do not necessarily give it time to polymerize properly, thus may result in a poor joint. Also times below 15 to 20 seconds often require excessively high voltages and a corresponding danger of arcs.

Time in excess of 60 seconds, for conventional edge-gluing of approximately 4/4 stock, generally do not permit the realization of the main cost savings of RF gluing. If the formula gives a time in excess of 60 seconds, more power should be used to cut down the time.

Heating times greatly in excess of 60 seconds on say 4/4 stock introduce another effect, illustrated in Fig. 11. Suppose the power is so reduced that a bond should be obtained in 4 minutes instead of 20 seconds. In four minutes time there will be considerable (a) loss of heat from the glue line to cooler adjacent wood, thus further increasing the time to perhaps 5 minutes for a good bond, and (b) loss of heat from glue line (a good heat conductor) to the cooler electrodes, resulting in less temperature near the surfaces than in the center. Further compensation to get the glue near the surface to bond, without increasing power, might take ten minutes total heating time. In other words, far insufficient power necessitates a more than corresponding increase of heating time.

Experimentally it is possible to use

this effect of low power and long times to actually char the center region between electrodes, leaving uncharred regions near and at the surface due to heat losses therefrom. A few investigators have believed this to be due to a "standing wave" between electrodes, but nothing in our experience has indicated other than uniform current and voltage gradient in uniform material placed in a uniform field. The uniform current, flowing from one electrode to the other through uniform material, produces uniform voltage gradient and uniform heat input to the material, but the temperature rise of any portion depends upon how much of that heat is retained and how much is lost to cooler surroundings.

For stock thickness of 3 inches to 6 inches, however, times of 3 to 5 minutes are often quite logical, and can take advantage of the fact that glues set at a lower temperature the longer it takes to reach that temperature, which effects some power economy.

A corresponding formula for end-gluing has not been devised, but this same formula should at least provide a fair approximation.

In practice one must begin with his anticipated production rate, assume a convenient press size for the shape and size of panels to be made, and then assume a generator continuous power output rating to calculate the heating time. If it falls below 15 or above 60 seconds, recalculate using less or more power, respectively. Then

TABLE 4.—TIME CALCULATION EXAMPLE

Pressload=1 inch by 40 inches by 80 inches, Stock=1 inch by 2 inches

Glue-line Area $G=19\times1\times80=1520$ square inches

Wood Volume $W=40\times1\times80=3200$ cubic inches

Moisture Content $M=7$ percent

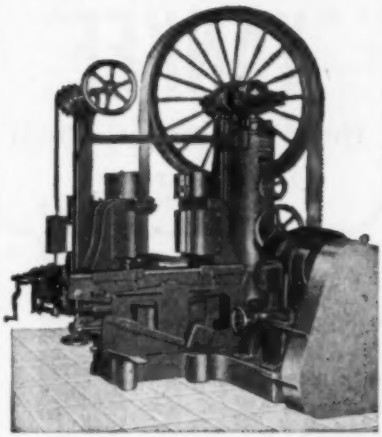
Power Output $P=22$ kw.

Batch Press, Staggered, Softwood: $A\times100$

$$T=\frac{18G+MW}{PA}=\frac{18\times1520+7\times3200}{22\times100}=23 \text{ Sec.}$$

McDONOUGH 54"

VERTICAL BAND RESAW



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(using the example of Table 4) if the reload time is 15 seconds, the total press cycle is 15 plus 23, or 38 seconds, so the number of pressloads for seven hours of actual operation is 3,600 x 7/38 or 662. If the 40-inch by 80-inch layup consists of eight 20-inch by 20-inch panels, this is 8 x 662, or 5,296 panels per shift, or 662 x 3,200/144 or 14,700 board feet per shift, if the fresh stock and layup men keep up with the press.

Assuming an optimum power of 20 kw. has been chosen, and that this power produces exactly the maximum safe electrode voltage to avoid arcs (say 1,000 volts), and that a good bond is obtained in 20 seconds, Table 5 shows the effect of altering this power upward or downward. Halving the power, of course, increases the heating time correspondingly. Doubling the power produces excessive voltage and probably arcs. If the arc does not happen to occur, the bond will be obtained in half the time, but this is hardly a dependable mode of operation.

Selection of Frequency

Optimum frequency depends upon the application, and is determined by the generator manufacturer who must weigh a number of factors. High frequency reduces electrode voltage and avoids arcs, while lower frequency decreases the complexity and cost of tuning systems and generally puts a greater proportion of power into glue rather than wood. Five to 6.8 MC is generally used for edge-gluing, but 13.6 MC is desirable in a few specific cases.

Shielding

Generators must be shielded. In order to comply with FCC regulations, all generators must be certified that they so comply. Responsible manufacturers recognize this and supply certificates with the generator, in our case

TABLE 5.—RF POWER and FREQUENCY

	Time		RF			Wood	Glue Line	
Power	Seconds	Excess	Power	Volts	Arcs	Temp.	Temp.	Bond
Halved	40 Sec.	100 percent	10 kw.	707 V	None	80°F	180°F	Excellent
	20	0	10	707	None	75	125	None
Optimum	20	0	20	1000	None	80	180	Excellent
Doubled	20	0	40	1414	Arc	90	290	Burn
	10	.....	40	1414	Arc	80	180	Excellent
Frequency								
Halved	28 Sec.	40 percent	12 kw.	1000	None	77°F	180°F	Excellent
	20	0	20	1288	Arc	78	199	Excellent
Optimum	20	0	20	1000	None	80	180	Excellent
Doubled	20	0	20	766	None	82	161	Fair
	24	20	20	766	None	84	180	Excellent

actually affixed to the door of the equipment.

Voltage Variation

Line Voltage variations must be tolerated. Most generators can handle plus or minus 5 percent variation without ill effects, but greater variations will shorten tube life. If greater variation is unavoidable, automatic regulating transformers should be used for the generator oscillator-tube filaments. In fact, it is possible to increase tube life with automatic transformers even if the regulation is within 5 percent. There is no need, however, to stabilize the entire input to the generator, as variable plate voltage has no effect on tube life. It does, however, affect power output; a 10 percent line voltage drop causes a 10 percent increase in

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heating time if the operator maintains constant plate current, or 20 percent if he does not, so wide fluctuations are to be avoided.

Tuning

Tuning must be simple, the arrangements varying with the manufacturer and with the application, their purpose being always to act as a variable-ratio transformer to vary the voltage across the electrodes.

Generators containing a complete "high-loaded Q" tank circuit, as contrasted to those which make the electrodes part of the tank circuit, will permit (a) automatic raising of electrode voltage during the heating cycle, thus shortening the heating time, and (b) location of the generator any distance up to 30 or 40 feet from the electrodes if necessary.

Manual or motor-controlled tuning is usually adjusted by the edge-gluing foreman when there is a major change of load thickness, number of glue lines, area, etc., by merely adjusting to a specified value on a panel meter. There is no need for attention between major changes.

Automatic tuning can be used, but it adds complexity and a requirement for increased technical maintenance skill. Our experience with automatic tuning for edge-gluing and other RF heating applications shows that there is usually no real economic advantage in using it, particularly with generator designs which permit inherent raising of electrode voltage during the heating cycle.

Importance of Designer Experience

Good design requires experience. Virtually all generator manufacturers use the oscillator tubes singly or in parallel, with one side of the output grounded. It is generally felt that this simplifies design and adjustment, re-

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duces cost, and facilitates remote generator location if desired. It also permits continued operation at half power in case of failure of an oscillator tube, and requires no balancing controls.

Tube life is primarily a matter of (a) experienced tube design, (b) experienced generator design, (c) good line voltage regulation as discussed above, and (d) use of equipment within manufacturer's ratings. If these factors are satisfied, an average life of 5,000 hours may be obtained. Occasionally, one will die at 1,000 hours, but many are still in operation at 15,000 hours.

The RF generators used for edge gluing are of standard design, also being used for wood lamination, cabinet assembly, plastic moulding, rubber preheating, curing, and drying, etc.

There is no substitute for experienced generator design and workmanship. Even those generator manufacturers with ten or fifteen years of successful medium- and high-power broadcast transmitter design behind them found serious and unanticipated hurdles when their RF generators got into the field. This sad and costly experience has led to generators, most of which today are very foolproof and dependable, requiring only a reasonable amount of maintenance. Without the benefit of this experience, it is almost a foregone conclusion that any radio "ham" (and I am a ham) attempting to design and build a generator for edge-gluing will wind up spending several times as much time learning how to make it work dependably as he did to design and build it.

The Installation

Adherence to the foregoing suggestions, to the best practicable degree, particularly in regard to stock preparation, will assure higher production

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rates and much lower costs per board foot of panel than otherwise now obtainable. Radio frequency gluing is a very high-speed tool, whose full economic advantage is sometimes not realized without correspondingly improving associated facilities. Glues have progressed very fast, and will continue to do so, to take even further advantage of the RF tool. Stock preparation techniques are improving.

This report is the first of a series, each on a specific RF gluing application, devoted primarily to how to get dependable results with available equipment.

The writer is indebted to Messrs. T. P. Kinn, M. P. Vore, R. E. Kirby and C. P. Bernhardt of the Westinghouse Engineering and Sales Departments for their many contributions contained herein, born of long and sometimes sad experience with many hundreds of RF heating installations.

The End

LOUIS ALLIS 50th YEAR

Fifty years is a long time for a manufacturer in the electrical industry as electricity did not come into its own until the turn of the century. However, the Louis Allis Company, Milwaukee, Wis., manufacturer of motors, is now in its fiftieth year.

Founded in 1901 by Louis Allis with the slogan "Integrity, Quality and Service," the Company has grown from 15 employees to an organization having nationwide sales and service offices. The golden anniversary edition of the "Louis Allis Messenger" gives a detailed description of the Company's development—a history of American enterprise and initiative.

The Company's first product was a line of direct current motors and in 1908 their first A.C. motor was produced. When the Company started, machinery in American shops and factories was mostly powered by belts fitted onto a shaft. This system was dangerous and unsightly because of the

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overhead tangle of shafts, belt and pulleys. One of the firm's earlier contributions to American industry was providing efficient motors for individual powering of machines. Motors have been designed throughout the succeeding years for such industries as the following: laundry, woodworking, printing, chemical, oil, foundry, textile, refrigeration, food machinery, dairy, brewing and many other industries.

During World Wars I and II the Company made outstanding contributions to our war effort.

On this their fiftieth year, we join their many other friends in wishing them continued success and growth.

WESTINGHOUSE BUYS PLYWOODS PLASTICS CORP.

Common capital stock of the Plywoods Plastics Corporation of Hampton, South Carolina was acquired by the Westinghouse Electric Corporation recently.

Plywoods Plastics manufactures plywood, flush doors and other wood products. It is anticipated that the production of plywood and doors will be continued. This production will be supplemented by the manufacture of laminated plastics which the half-million square foot plant is now equipped to produce. Also to be produced are molded composition plastics products to be used in apparatus manufactured in various Westinghouse plants.

BOICE-CRANE CATALOG

Boice-Crane Company has issued a 48-page catalog featuring power tools for cutting, shaping and finishing wood, metal, fibre and plastics. Among the tools illustrated and described are jointers, planers, band saws, drill presses, jig saws, lathes, belt sanders, shapers and saw jointers.

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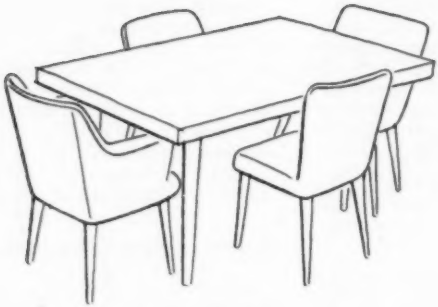

This NAIL GLIDE *stays put*

Roll threaded for extra holding power, this nail-type glide stays put in all types of wood. Assembly is quick and easy; simply drill an undersized hole and ram home. The threads, with a full inch of effective length, bite into the grain of the wood and *stay there.*

The hardened, polished and plated steel cap of this glide is cushioned against vibration noises by a thick rubber pad. This assures silent, effortless movement over all surfaces. Smooth finish prevents scarring and scraping.

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by H. H. Connelly

PART 2

IN any wood bending process there are certain basic principles which are fundamental and must be remembered. In short it makes little difference whether this is a chair back, a scythe handle, or a tennis racket, the dimensions around the outside of the bend will be greater than the inside measurements. If this has changed, there will be little fuss among the jockeys to see who gets the inside rail at the next Kentucky Derby.

For example, a chair rail 1 inch thick, bent in a right angle on a 6 inch radius will measure close to 9½ inches on the outside radius, and will be less than 8 inches around the inside.

Consequently this difference of 1½ inches in the length of the two sides, which prior to bending were equal, opens up a most perplexing channel of thought. We have a surplus of wood, what must we do with it?

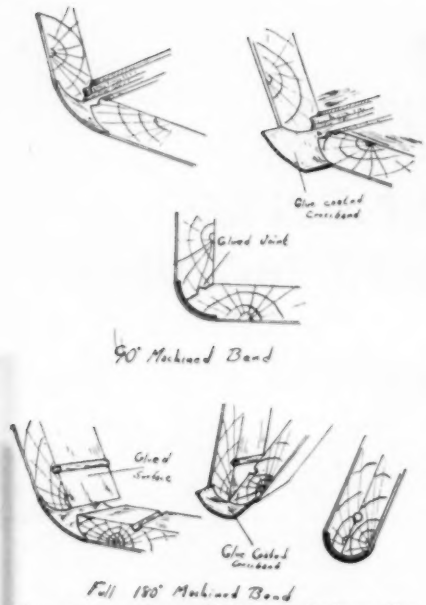
In the case of surplus wood we can do like the little boy—whittle it away or we can compress it to a smaller mass. In some instances we will do well to combine the two.

The bending machines do just that—compress or upset the wood fibers through heat and pressure. This is understandable if we recall that wood is of a texture that has a negligible stretching point. The fibers are very easily ruptured under strain. Luckily for the wood bender the fibers or wood cells which make up the structure are cemented together by nature's own glue, lignin which liquifies under heat and allows the fibers to slide upon themselves to assume a different shape. After the wood has been forced to the new shape and cooled, the inherent cement becomes solid once more and binds the fibers in their new position. This loosening and resetting of the wood fibers in an altered position is the basic theory of all wood bending.

A number of bending machines are on the market for doing the job described. You will find better types electrically heated with interchangeable cauls capable of heating from 225° to 350° F. with the heat controlled by an automatic thermostat.

The bending motions of the machine are actuated slowly, and powerfully by air cylinders operating under 80 to 100 lbs. The speed of the bending motion, from flat to 90°, is adjustable within a range of two to fifteen seconds per cycle.

For successful bending it is well to remember that plywood should not exceed ⅛" to 3/16" in thickness if bent into a one-inch radius. Like a fat man,



Two types of machining technique for producing modern furniture bends. This is the strongest type known and can be produced quickly and cheaply by modern machines designed for high production work.

the thicker the meat the less the bend. Now if the radius is increased to two inches the thickness may be increased to ¼" or ⅜" and up to ½" if the bend is as large as 3". However, it is wise for thicker stock to combine a machining operation and remove a portion of the wood before bending on the hot bending machine. An example of this is the hollow corner bend or the serrated bend described under machining for bending. (July WOOD WORKING DIGEST).

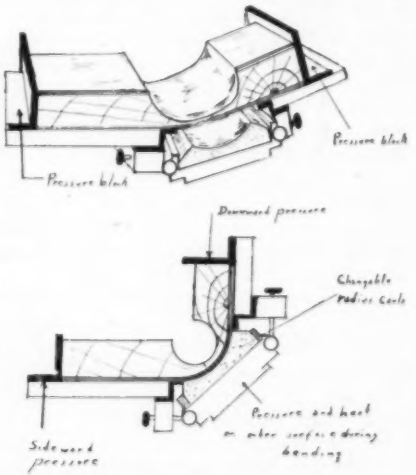
Mechanically the machine is simple to operate with few adjustments to confuse the operator. The only change necessary in operating the machine is the interchanging of the cauls which are machined to the radius bend to be formed and this change requires a minimum of time and skilled labor.

The time required to complete a bend varies with the stock thickness. For the thinner stock 40 seconds is ample. For the thicker bends it requires as much as 2½ minutes.

Once the bend has been completed the stock is placed in frames or shackles and set to one side to allow the lignin to cool. After cooling the parts will remain fixed and the shackles can be removed for another run.

One advantage of the hot bend process is the characteristic of the machine to minimize the tendency to fracture the face of highly figured and fragile wood veneers. Since the bend is made dry, staining and raising of the grain is avoided.

Another paramount advantage to the manufacturer is found in the fact that the stock can be sanded flat on high



Line drawings illustrating diagramatically the principle of the hot caul bender. Through heat, applied at the surface bend after the veneered panel has been upset by the hollow bend machining method, the wood lignin is softened and the wood fibers alter their position without disturbing the fragile face veneer.

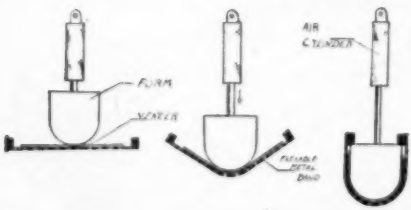
production machines before bending. Inlays and marquetry can be used on the round corners without the dangers of opening the joints when bending.

In making radio cabinets, furniture tops, waterfall fronts, furniture corners, caskets, cedar chests, display fixtures and a thousand other curved items not mentioned, the hot bending machine is fast, accurate and economical. Its use is highly desirable also for bending stock too thick to bend without first upsetting the material by one of the various machining methods which are discussed later.

Flexible Metal Band Technique

"As the twig is bent the tree will grow." And we will add to bring our quaint epigram up to date for the benefit of the modern furniture age: "As the veneer is glued, so shall the plywood remain."

One sure-fire prediction of compelling interest to the manufacturer of curved furniture members from plywood is the assurance it will "stay put," once the glue has set and hardened the multiple plies into a solid mass. An assumption the early manufacturer of curved furniture parts could not entertain when made from solid lumber



Flexible band process has many applications on gluing thin plywood. The first view shows the veneer ready to be bent around the mold. In the center the air valve has been opened and the air jack is forcing the form downward. In the third position the form has completed the travel and the flexible metal band securely fastened into position for curing.

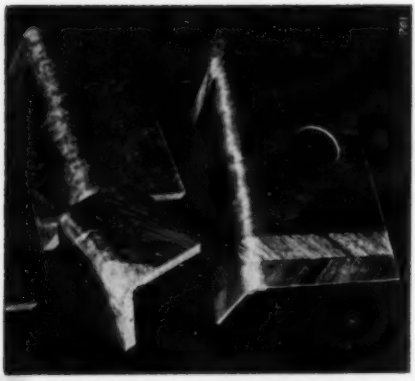
A retainer of gluing forms being removed from the electric press. Four such units stacked in one retainer saves floor space and handling costs.

bent by force and heat—usually from a semi-dry or even green state, depending upon the kiln drying process to fix the wood fibers eternally in place.

Multi-curved piano stock, round table frame, etc., were manufactured by this method until the renovating improvement of the newer types of urea formaldehyde and phenolic glues gave the manufacturer the necessary assurance that the parts would not fall apart once they had been exposed to adverse humid climatic conditions, unfavorable to the known types of glues then in use.

Gluing plies of veneer into semicircle shapes by the flexible band process is a favorable method of reproducing facsimile of the form with each loading. Parts up to ¾" are being successfully glued by this method. For thicker stock, other methods previously explained, are preferred by most concerns. This is because the heavy pressure so necessary for bending thick veneers is more difficult to provide by this process.

In using the flexible metal band technique it is necessary to have only



Little difficulty is encountered in producing modern furniture bends with modern tools designed for high production and quality work. Here are samples of highly figured veneered panels bent by the combined operations of machining and the hot caul bender.

one section, a forming block. The band replaces the second half and provides the contact pressure to maintain the desired shape. An 18 gauge stainless steel band is best as it provides relentless protection from the corrosive action of oxidizing urea and phenolic glues.

There are many variations, however, to this method through the addition of labor saving, mechanical improvements and are easily applicable to this principle. Chiefly we could mention air clamps to hold the forming block in place and air jacks to give the necessary bending pressure to press the veneer into place. Screws are frequently mounted on the unit to replace air devices and in one modification the steel band is rigidly fastened at the top of a frame and the veneer is pressed home by forcing the forming block into place.

One concern has worked out a highly proficient arrangement for flexible metal band gluing of three ply instrument shell covers by utilizing the unbeatable combination of heated retorts and gravity feed conveyors.

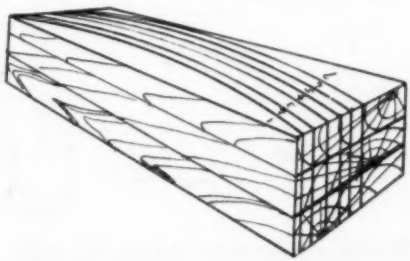
Urea formaldehyde glue is used as an adhesive and as fast as a form is loaded, it is placed on an incline conveyor which moves the stock through a heated retort for fast setting. The same operator unloads and loads the retainers which make a turn after leaving the kiln and flow back to the loading point.

Solid Block Core Method

Gluing veneer to solid cores that have been pre-sawn to the desired curvature is probably the oldest curved veneering method in existance and still favored by many manufacturers of high grade furniture today.

Hepplewhite and Sheraton utilized this method and today antique collectors would give their eye teeth for just one old dilapidated sideboard made by either. By this method several parts can be produced from one built up core of solid lumber.

It should be remembered when using this method to saw to the correct radius, and for good gluing, to have the saw teeth set wide enough to remove a kerf equal to the sum of the thickness of veneer to be glued to the face and back of the individual sec-



How large sections of wood are glued together and sawn into curved sections of solid lumber cores for veneering. It is important to veneer the sections in the same position as sawn. Numbering the sections consecutively by the saw operator is helpful.

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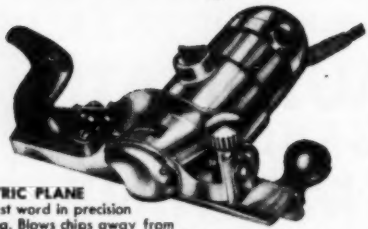

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tions. For example a 1/28" top and bottom plus two 1/28" cross veneers would equal approximately 9/64". The saw should then be swaged to 9/64".

One manufacturer unaware of the importance of maintaining this clearance received frequent complaints from the retail stores to the effect that the backs and faces were showing a loose veneer condition after setting in the show room under changing weather conditions.

A check of the manufacturing methods pointed out that the saw filer had failed to provide the required tooth set on a batch of new saws that had been opened up and used on that particular production run.

The advantages of this method are obvious. No dies are needed and no expensive forms required. Solid lumber of a cheaper grade can be used for cores in building up a thick drawer front or related furniture parts.

Precaution must be taken, however, to re-assemble the respective sections exactly as sawn or a slight variation in band sawing from one part to the next, even the width of a lead pencil mark, will result in a loose veneer condition or an irregular surface.

This method has decided advantages from the cost angle, especially on small runs and special jobs where the cost of expensive forms would be prohibitive.

It has one fault, however, the radius changes slightly on each piece. A fault questionable at first glance, but readily understood upon examination.

(To be continued.)

ADHESIVES FOR BONDING WOOD TO METAL

Developments in the new technique of bonding wood to metal with special adhesives are summarized in a pamphlet issued by the U. S. Forest Products Laboratory.

This pamphlet, prepared by H. W. Eickner, Laboratory engineer, and R. F. Blomquist, chemist, describes some of the improved types of wood-metal adhesives now commercially available, the conditions of bonding that should be used with these adhesives and the strength and durability of bonds obtained when the adhesives are properly used. Three main groups of high-strength adhesives are discussed. They are: (1) the direct-bonding, high-temperature-setting, (2) the two-step-bonding with adhesive primer and secondary adhesive, and (3) the direct-bonding, room-temperature-setting groups.

The report describes the general considerations in the bonding procedures, the preparation of the wood, the cleaning of the metal, and methods of applying the adhesives, as well as the actual bonding conditions.

For a copy write the U. S. Forest Products Laboratory, Madison 5, Wis.

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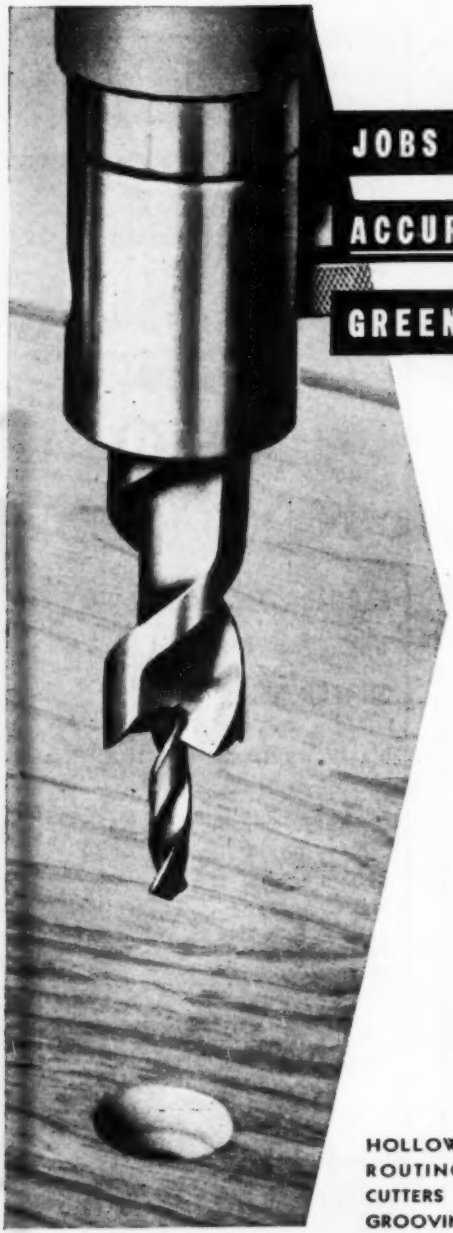

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SELECTION OF MACHINERY FOR THE JOB

by E. C. SWANSON
Andersen Corporation
Bayport, Minnesota

THE woodworking industry has long since passed that stage of development characterized by the substitution of machinery for hand labor. The woodworking machinery manufacturers have matured equally in their business of supplying uniformly dependable equipment for our use. While continuing to search for better ways to serve, certainly they have already reached a high level in the application of well seasoned, mechanical devices to perform specific woodworking operations.

There is a wide range of equipment in both the processing and materials handling field. While the actual selection of a specific machine or other mechanical device from among those offered represents an interesting piece of work and requires the attention of all the experts available, I would prefer to discuss the background for machinery selection, or some of the broader aspects of the general problem.

It seems likely that greater mechanical progress in our industry will come from: (1) Substituting a new device or a battery of machines, or a different method for doing a better and more efficient job in place of the equipment or method previously used. (2) A rearrangement of the machinery and the installation of improved devices and methods for handling materials.

There are numerous examples of new high speed machines, each of which will do a certain job in less time than could be done on the equipment made obsolete by the new development. Automatic clamping combined with electronic glue curing is an example of this progress. High speed moulders and specialized tenoner combinations are other examples of the same trend.

Standing by themselves, these new machines not only demonstrate the initiative and capabilities of the machinery industry, but they represent a potential step forward for woodworkers. On the other hand, a woodworking plant conceivably could have installed a great many of the very latest machines and yet could be suffering from inefficiency. To use a well worn analogy, such a condition would be similar to a collection of the very finest automobiles in an

This article was originally presented at a sectional meeting of the F.P.R.S.

area lacking in suitable highways for their use. The total of the equipment for good transportation would be sadly out of balance.

I would like to emphasize the importance of this element balance as background for machinery selection.

By balance I do not refer to either static or dynamic balance of a rotor or shaft; I mean that kind of balance that is described as running on an even keel. I recognize that perfect balance in any manufacturing operation cannot be expected, particularly during the time when changes and improvements are underway. Very often progress is a matter of pulling up hand over hand, and that means unbalance of a sort, the correction of which can be planned in an orderly way. Troublesome unbalance of a continuing nature, on the contrary, is often the result of narrow planning.

There are many obvious examples of poor selection resulting in unbalanced operation. It is easy to point out the fallacy, for example, in selecting a moulder that is expensively built to operate at 400 f.p.m. when the material to be put through is of such short lengths that the hopper can't be kept full at that speed and where there is not room enough in the area for a suitable conveyor to take care of the output without excess labor cost. There are other examples — some of them less glaring — resulting from oversizing, that is, selecting a machine larger or faster than necessary for balanced operation. The trouble may arise because the power feeder or the compressed air supply or the sizing of the dust exhaust lines and fans is inadequate. Deficiencies of this type can be overcome and forgotten when paid for, but unwise selection may result in permanent excess costs if the time required for setting up the machine is out of balance with the volume of work per setup. This can be even more aggravating if the machine is of such capacity that it can be kept busy only a small part of the time under normal conditions but demands a high rate for the operator. The question then arises — can the operator be used effectively at his high rate on other work, or is there extra cost in this item?

It does not require profound thinking to point out the foregoing pitfalls in the selection of machinery, but they must be kept in mind if satisfactory balance is to be maintained. In addition, and perhaps more important, the balance of one operation with the others in the sequence of manufacturing must be borne in mind. This is particularly important as more emphasis is placed upon the problems of materials handling.

The woodworking industry has a job of handling and processing bulky materials and it may be just criticism to point out that our industry has lagged in adopting improved methods and devices available for this job of handling bulky goods. There are examples in other industries, principally in the forming and fabricating of metals, where at least as much, if not more attention has been paid to labor saving and space saving possibilities in the handling and storing of materials as to the details of the actual processing.

It is false economy to install the very latest in processing machinery unless the methods of supplying these machines with material to be processed have been brought up to date. There are many unfortunate examples of overemphasis on individual machines with horse and buggy methods surrounding the individual processes. To achieve the desirable balance, very careful consideration must be given to the space required for work in process and to the methods or mechanical devices that will deliver, receive and transport the material in between. As this need for balance is given greater considera-

tion, the flexibility of any certain machine or the ability to adapt it to a variety of operations may become the most important element of comparison on which to base a selection. If the flexibility of one machine reduces the needed space for work in process and permits a more simple arrangement for the efficient handling of materials, the savings realized may offset many times the theoretical saving that could be credited to a faster or larger machine for the same job.

Careful attention to the materials handling angle in another instance might well suggest a rearrangement necessitating the placing of duplicate machines in several locations. This in turn might influence a machine selection toward several smaller units rather than one large machine.

We have found in our own operations that our selection of machinery for the manufacture of window parts has been very materially affected by our desire to improve the ways in which we transport and store the materials. In a number of cases the careful study of the combined jobs of processing and handling has given us better balance and greater labor savings.

The machines that fit into a well balanced operation may not be those with the highest speeds, but rather those that fit the tempo of the equipment on either side. Careful analysis of the whole picture may lead to the selection of a custom built machine that can combine two or more operations. The extra cost may be offset rapidly by a savings in equipment or labor or both used in another arrangement for receiving or transferring the materials.

An example of how processing and handling must be coordinated for best results is the successful use of hydraulic lifts at the outfeed end of moulders running short stock. We find that one man can tend the feeding hopper and tend the outgoing material without loss of machine time. This is made possible at speeds up to 150 f.p.m. on sash stock through the installation of the elevator which is controlled for height by the operator as the outfeed load builds up. The one-man operation shows good balance and a very worthwhile saving, which will quickly amortize the investment in material handling equipment. Under such a plan the selection of the molder must be made with heavy consideration for a balance with the elevator equipment.

Somewhat similar conclusions have been reached in the cutting department when rip saws are selected with due consideration for balance with the means provided for transferring the ripped lumber to the cutters.

I believe it is safe to say that in many of our plants a comprehensive analysis of cost would show that about as much labor is spent in placing the materials in position for processing and transferring from one process to another as is spent in bringing the cutters or other tools into play. If this is true, it would appear logical that a proportionate amount of time and money be invested in efforts to reduce the handling labor. Certainly there are exceptions within our industry, but in most cases I believe the solution of materials handling problems has been neglected. It has been my further observation that more thought devoted to the solution of these problems at the time of machine selection would bring about a better over-all balance.

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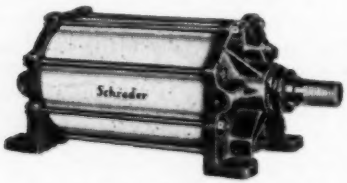

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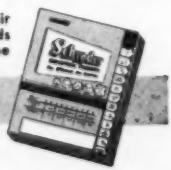


GLUING

Technique for wood

7. ASSEMBLY JOINTS

BY THOMAS D. PERRY

AN assembly glue joint is rather a formidable term to describe the ordinary gluing jobs with which most of us are familiar. It is a convenient term to apply to numerous types of gluing, which are not edge gluing in veneer or lumber, nor surface joints in plywood, nor the flat gluing required in laminated timbers. In the main, the above major gluing applications are factory operations, in which the quantities of glue used are considerable, and the type of surface, the pressure, the dryness of the wood, and the time-temperature requirements can be carefully regulated.

Assembly glue joints, on the other hand, are phases of gluing technique in the factory, where drawers are assembled, cabinets are put together, mortise and tenon joints (as well as dowel) are fabricated into door frames, and the like. Since glue is used in minor quantities, there is far less mechanical spreading, a quick "tacky" grip is essential, and the exact pressure can seldom be determined. Glue is applied more generously and often has to serve as a filler for inevitable voids, as well as an adhesive.

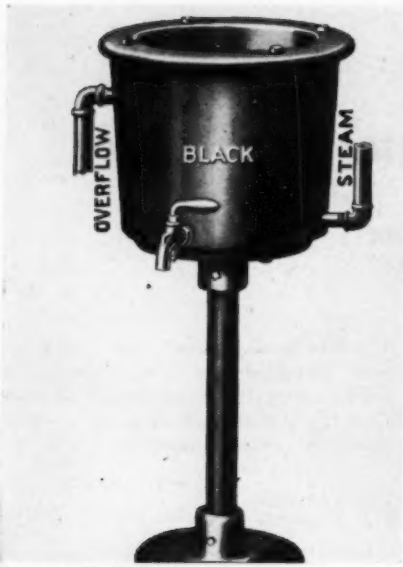
Leaving factory gluing out of consideration for the moment, the assembly glue joint is almost the only type of gluing with which the general public is well acquainted. The home workshop, the hobbyist, the manual training school, and the helpful but somewhat reluctant husband and father, who has been inveigled into home repairs, all employ glue for a multitude of uses. Most of these glue applications are what would be termed assembly joints.

Types of Glue For Assembly Work

Probably animal glues, blends of bone and hide, are more widely used for assembly joints than any other type. Prepared glues may come next, followed by packaged powder glues such as casein and urea resins.

This predominant use of animal glue is partly traditional and partly due to its wide range of adaptability. While liquid animal glues are available, most woodworkers prefer the dry form, which is dissolved, melted and kept warm in a pot surrounded by a hot water jacket, as shown in Fig. 1. There are a number of manufacturers of heated animal glue pots, single or arranged in gangs, heated either by steam or electricity. In melting the glue, after soaking, the temperature should not exceed 160° F., and the pot is usually held at around 125° to 140° F. during use.

The standard formulations are 1½ to 2 parts of water to 1 of dry glue, by weight, which will ordinarily take a firm grip within approximately an hour. Such mixtures can also be used for



Courtesy Black Brothers Co.

Fig. 1. Individual heated pot for animal glues.

"rub" joints, which are merely rubbed in place, under hand pressure, to get close contact and eliminate air bubbles. It is important that wood, for animal gluing, be at temperatures of 75° to 90° F., since the adhesive qualities of animal glues are impaired by chilling. Well made animal glue joints will last indefinitely when not exposed to moisture.

Prepared liquid glues usually contain derivatives from fish bones and bladders, together with proprietary ingredients, and can be used direct from the container. If containers are kept closed such glues will usually last until used up. The labels usually indicate "thinners," if any, that may be used if needed.

Polyvinyl resin adhesive emulsions are a recently developed assembly glue and are supplied in liquid form ready to use. They exhibit a very quick "tack," require minimum clamping cycles, and give strong durable bonds when not exposed to moisture.

There are a number of so-called "cements" claimed to be suitable for glass, metal, paper, cloth, rubber, plastics, etc. Most of them are of doubtful value for woodwork.

Packaged powdered glues are usually caesin or urea formaldehyde resins, which can be mixed with water at room temperatures. The mixtures are thinner and less "tacky" than animal glues and usually require longer clamping cycles, of the order of 3 to 4 hours. The ureas can be heat cured as explained later. Joints made with casein or urea have substantial water resistance, a distinct advantage in many types of assembly gluing. Mixtures of these powdered glues usually have a spreadable life of 3 to 4 hours, and unused remainders must be discarded.

Preparing Wood For Assembly Gluing

It is of prime importance that the mating parts of any assembly joint be well fitted, since no glue is an efficient gap filler, and contacts forced under pressure will inevitably result in internal stresses that weaken a glue joint. All fits should be carefully checked for snugness before the glue is applied.

Freshly planed surfaces are preferred for gluing, since sanded surfaces are likely to be rounded at the edges. When planed surfaces are not practical, a scraped surface, in a true plane, makes a better glue joint than a sander surface. If sawn surfaces are to be glued, heavier spreads and higher clamping pressures will be required to offset the unevenness of the rough surfaces.

In the case of inserted joints, such as dowels and tenons, the fit should not be so tight that the glue will be scraped off the contacting surfaces as they are pushed into place. This applies to nor-

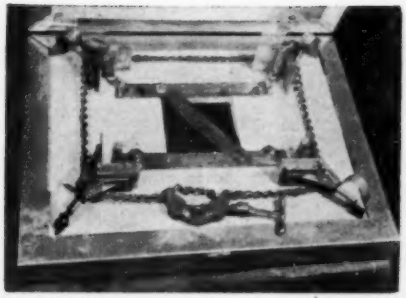


Fig. 2. Electronic clamp for rectangular frame of wood.

mal types of inserts, compressed inserts are described below.

The moisture content of the wood parts in an assembly joint is important. When using animal, casein or prepared liquid glues, all of which have high solvent ratios, the wood should be as dry as possible, 5% moisture content or lower. With urea resin mixtures, which have low solvent ratios, inadequate penetration is likely to result if the moisture content of the wood is lower than 7% to 8%.

Repair Gluing

In the case of repair jobs, the conditioning of the surfaces is especially important. In regluing surfaces that have separated at the glue line, the old residue must be carefully and wholly removed, and the surfaces scraped clean before applying fresh glue. Where breaks in the wood are to be repaired, care must be taken to remove all splinters and other irregularities that would prevent the snug fitting of the uneven surfaces. Since wood in such repair operations is inclined to be overdry, it is often desirable especially with urea resin adhesives, to slightly wet the surfaces before applying fresh glue. Clamping repaired glue joints requires a bit of ingenuity, especially in a home workshop, screws, wedges, twisted wires, sand bags, band and chain clamps and the like.

Applying Assembly Glues

Brush application is the conventional method, although glue rollers are sometimes practical. For inserted joints, dowels, tenons, dovetails and some types of lock corner joints, a pressure gun, spreading a bead of glue, may be useful. Occasionally a spray gun is needed for hard-to-get-at locations. All application equipment should be kept scrupulously clean and in condition to spread a thin uniform coating of glue. Caked brushes or wooden paddles should never be used.

Double spreading, on both mating surfaces, is the usual rule in assembly joints, to secure equal penetration into both surfaces, but there are exceptions in inserted joints, where the glue is squirted into the hole, and the inserted member is not coated with glue. When "endy" wood is to be glued against "side" wood, as in some types of butt joints, more glue should be applied on the porous surface because of excessive penetration tendencies. The same procedure should be followed on mitered joints. A preliminary sizing, with a dilute glue mixture, is often helpful to

Fig. 3. Loaded clamp and electronic generator.

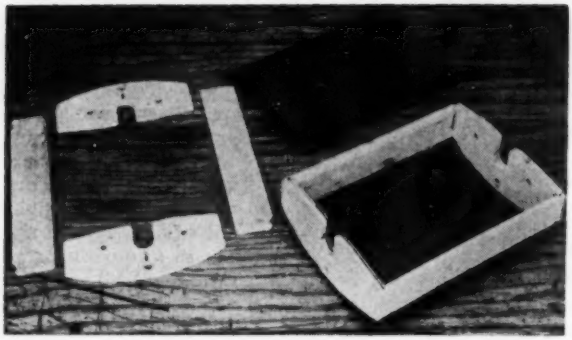


Fig. 4. Unassembled and assembled carpet sweeper box.

control penetration in such "endy" surfaces.

It is often desirable to leave the joint open, after spreading, for a 3 to 5 minute interval, to allow excess solvent to escape, rather than to seal too much moisture inside for later slow diffusion. The glue should always be "tacky" when the pressure is applied and pressure should be continuous, without dimunition, until the glue has taken a firm grip.

Clamps for Assembly Joints

The market offers a wide range of assembly clamping devices, and there are far too many to attempt to enumerate or describe them here.

There are certain fundamentals that clamps should have, viz.:

(1) Quick closing
(2) Adequate pressure in the right direction
(3) Proper sequence of pressure applications
(4) Continuous pressure, with no let up
(5) Easy removal of clamped assemblies

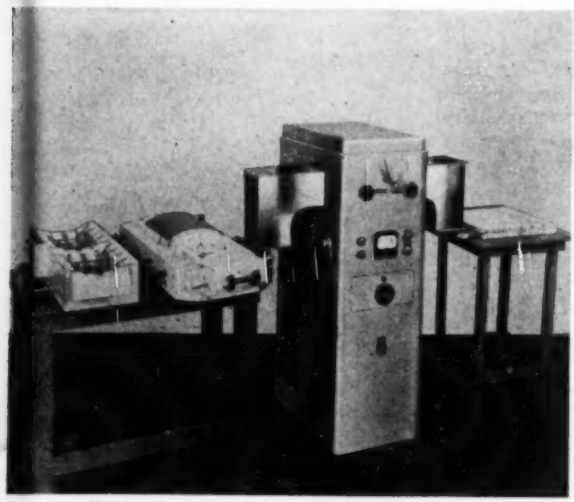


Fig. 5. Twin clamping form and generator for carpet sweeper box assembly.

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No Sherlock needed to find the perfect bonding agent for your gluing jobs. It's easy to locate in the container marked "URAC-185". Designed especially for assembly work or for gluing where inadequate pressure or irregular surfaces prevent uniformly thin glue lines. Use for furniture, toys, boats, millwork or wherever a joint stronger than wood or plastic is desired. AVAILABLE IN SMALL CONTAINERS: Pints, quarts, gallons and fives. FREE BULLETIN OR ORDER DIRECT. Branches at 109 Water St., New Haven 11, Conn., P.O. Box 8, Station D, Dayton 10, Ohio, 1103 W. Marietta St., NW, Atlanta, Ga., 705 Cullen Blvd., Houston 3, Texas, 760 Aloha St., Seattle 9, Wash., 5928 So. Garfield Ave., Los Angeles 22, Calif.

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THE NELSON COMPANY
IRON MOUNTAIN, MICHIGAN

While screw pressure is the usual rule in assembly clamping devices, this type is gradually yielding to pneumatic pressure mechanisms. These have the advantages of quick and easy application in any sequence, of follow-up characteristics, and their intensities can be readily calculated.

Compressed Dowels

Recent developments in compressed dowels, tenons, splines and other types of joint inserts are a new approach to corner joint constructions, which substantially shorten the required duration of pressure application. In using such compressed inserts, it is necessary to squirt the liquid glue mixture into the recess, so that the dowel can be pushed home easily, and the glue forced around the entire contact area before the solvent of the glue begins to cause expansion. While the compression of the insert is relatively slight, of the order of 1/16" to 1/32" in the diameter of a ½" dowel, any moisture quickly swells the dowel to its original uncompressed diameter, and thus adds the friction of a tight fit to the inherent strength of the glue itself.

The normal uncompressed dowel, when it comes in contact with the glue in the recess, at first, swells and provides a tight grip, but subsequently it shrinks and tends to work loose and weaken the joint. While the compressed dowel, when wet, swells to a tight permanent fit in the hole, and, on drying, will not shrink back to its compressed diameter nor work loose. This is why compressed dowels produce such strong durable joints.

Experience has shown that compressed inserts, such as dowels and splines, do not swell appreciably under the influence of normal atmospheric moisture. Nevertheless, long storage is not desireable, and supplies should be freqently replenished, and used in the sequence of their receipt.

High Frequency For Curing Resin Adhesives in Joints

The water resistant characteristics of urea resin adhesives in joints is particularly desirable for products used in semi-exposed locations, such as doors and window sash. Urea resin adhesives have less "tack" than many other assembly glues, and hence clamping requirements, as to the time factor, may slow down production cycles.

Some ingenious applications of high frequency have substantially shortened these time cycles and reduced pressure requirements to a minimum, thus stepping up production to an economic and efficient basis.

It is well known that high frequency current is selective with regard to wet spots in the wood, and will raise the temperature much more quickly at these wet spots than elsewhere in the dry wood. Hence a freshly glued area, which may be somewhat out of the direct electric field between the electrodes, will heat rapidly and the resin adhesives in this area can be cured by heat. This has been termed "stray field" electronic heating and has a multitude of applications in assembly gluing. The electrodes must be reasonably close to the glued areas, and can be incorporated in the clamps, with proper insulation.

A simple example of such an electrically equipped clamp is shown in Fig. 2, in which the outside metal corner angles are connected to one electrode, and the inside metal corner posts are charged by the opposite electrode. The inside metal posts are fixed rigidly in the desired positions and the outside corner angles can be tightened by the chain clamp. The end and side strips of this frame are shown, glued and clamped together, in the right view of Fig. 3, with the high frequency generator indicated at the left. The coiled springs, at each corner in Fig. 2, merely serve to open the clamp when the pres-

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sure is released, thus to facilitate the removal of the frame after the resin adhesive has been cured.

Electronic clamps of this general type can be designed for a wide variety of corner joints of almost any size.

The metal clad box in which the corner clamps are housed serves to conserve heat, and to protect the workmen from dangerous shocks and burns.

Another application of stray field electronic heating in assembly glue joints is shown in Figs. 4 and 5. The unassembled parts, comprising the carpet sweeper box, are laid out separately at the left in Fig. 4, the wood parts being machined with lock corner joints, and the fibre top being pre-curved. At the right of this view is a completely assembled box after removal from the clamp.

The two halves of the twin wooden clamp or form, are illustrated in the left view of Fig. 5, the curved fibre top being removed from one of the boxes. The pressure for uniting the wooden ends and sides of the carpet sweeper box is an ingenious application of tubular pressure by means of a flexible rubber hose, which extends around these sides of the periphery of the wooden clamping form. One long side of the clamp and the center cross divider are rigid. Inflating the hose by pneumatic pressure provides horizontal pressure in two directions to force all corners of the box together snugly. This side pressure is almost instantaneous and exceedingly simple, merely opening a valve by a foot lever. The various metal bars in the top half of the form "spot weld" the curved fibre top on the sides and ends of the box, when the two halves of the form have been snapped together. The coiled springs open the clamping surfaces when the hose is deflated and facilitate the removal of the carpet sweeper box after the adhesives have been cured.

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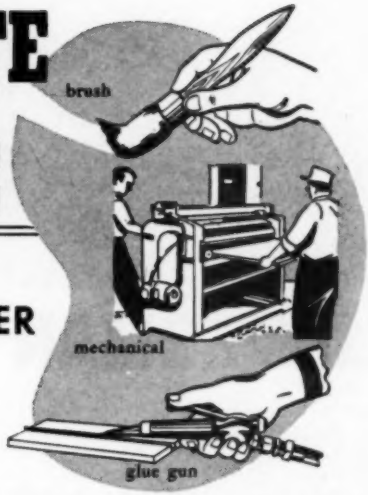

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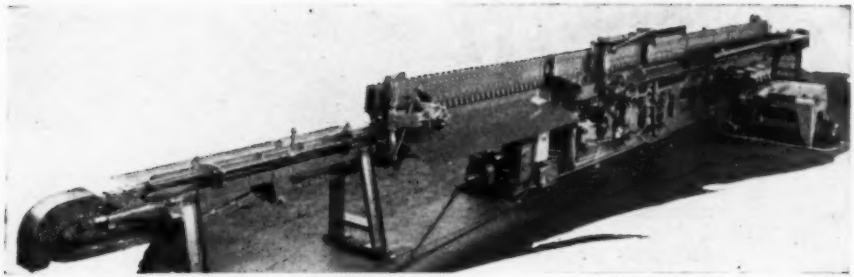
These electronic applications in curing resin adhesives in assembly joints, have done much to encourage the making of more water resistant joints. They have also shortened the clamping cycle far below that possible with any of the conventional glues hardened at room temperatures.

Conclusions

While assembly joint gluing presents a great many problems, of selecting the right glue, of applying it properly, and of devising or adopting quick and reliable clamping devices, these problems are not too difficult and are reasonably solvable. The basic principles have been well established, and a wide variety of equipment is available.

Vacations have been easy to plan this year. The boss tells you when and the wife tells you where.



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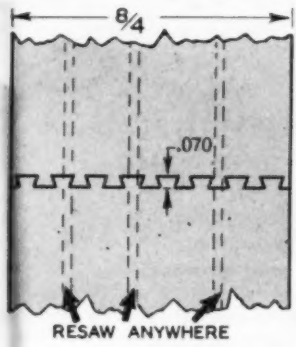

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GOT ANY LEFT-OVERS?

Do you work for a factory or shop that has obsolete machines in storage? Does your plant fail to save its scrap? You can help make money for your Company and help the steel industry make more steel by suggesting that all industrial scrap be sold to local scrap dealers.

Some astounding statements in regard to the scrap shortage have come to us. We are passing some of them along to our readers, asking their cooperation in this critical shortage.

Supplies of heavy industrial iron and steel scrap are dangerously low. Several steel companies have less than two weeks inventory on hand. Some have only a few days supply. Others have already lost some production, either through downtime or because the use of

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inferior grades of scrap has not permitted maximum output per ton of raw materials used.

Recognizing the seriousness of the threatening scrap shortage, a special program is being conducted by the National Production Authority to seek out dormant scrap and place it in normal channels as quickly as possible. Government (federal, state and local) business, industry and agriculture have been asked to cooperate, the latter three through their trade associations. Local Chambers of Commerce throughout the United States are recruiting Scrap Mobilization Committees, steel plants and foundries and scrap dealers have formed a Mobilization Committee for Iron and Steel Scrap. The Advertising Council has initiated an advertising campaign as a public service for trade paper placement.

This is not a household scrap drive like some conducted during World War II. It is aimed rather at management and administrative officials who are in

NATIONAL HARDWOOD LUMBER ASSOCIATION

"What Goes On?"

- Uncertainties are growing in size and number.
- Will it be inflation or deflation?
- How is the hardwood market going to react?
- What about government controls?
- How much hardwoods will the government need for defense?
- What is happening to the furniture trade?
- What about building volume for the future?

• • • • •

54th Annual Convention

Sherman Hotel, Chicago, September 25-27, 1951

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These and many other questions uppermost in the minds of the hardwood lumber trade will be discussed.

You may not find all the answers but you will gather information to help you form judgments.

Your customers will be there. Trading will be going on.

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No lumberman interested in producing, distribution and consumption of hardwoods can afford to miss this vitally important Convention. Come as a member, but if you are not a member, you will wish to be, so that gap can easily be filled. But member or not, come and enjoy the NHLA hospitality and fellowship. Hear the splendid speakers. See this great hardwood industry in action.

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Here is just one of an exceptionally fine line of standard form cutters and bits . . . which offers savings to increase your edge in the competitive market . . . reliability and accurate profile to lower your production costs. Use these small and inexpensive form cutters in your high speed routers for quality work at lowest possible cutter cost.

Do you have your copy of the big Onsrud 80 page catalog showing cutters and bits for routing and shaping and every other related application? Write today.

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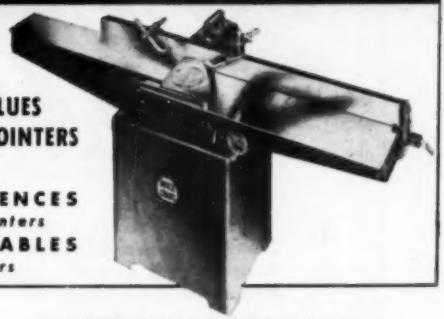
a position to make policy decisions that will assure quick action in (1) the collection of random heavy scrap, and (2) the writing off of idle, obsolete machinery and equipment.

The help of businessmen everywhere is needed. Active interest of top management and administrative officials can start obsolete equipment and other scrap on its way to the mills. Insist on this 4-step program in your organization:

1. **Go After Dormant Scrap.** Start an emergency inspection and inventory of all heavy steel, whether machines, equipment, beams or plates. Sell everything you can possibly spare to your nearest scrap dealer.

2. **Keep The Scrap Flowing.** Organize a clean-up committee, if you do not already have one. This should be headed by a man from top management who has the authority to scrap obsolete equipment. Continued in-

Announcing BOICE-CRANE'S NEW, LONGER TABLE JOINTERS



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Rugged enough for planing mills. Accurate enough for demanding cabinet makers.

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Permits strength, permanent accuracy and alignment impossible with bolted-up cast iron construction.

LENGTH WITHOUT WASTEFUL UNUSED WIDTH

Using steel (2½ times as strong as cast iron of same thickness), jointer tables can be extended without increasing width, thickness, weight or floor space. A cast iron jointer comparable all ways to Boice-Crane's new jointers would weigh more than twice as much.

NO SPRINGY OVERHANGING TABLES TO SPOIL HEAVY WORK

Tables undergirded full length.

THE ENTIRE INFEED TABLE A RABBET ARM

The first jointers with adequate support for narrow rabbetting on wide stock.

TABLES GROUND FLAT, STAY FLAT

Both tables are simultaneously ground flat and parallel to closest limits.

QUICK, POSITIVE, MICROMETER-ACCURATE KNIFE SETTING. FINISHES BETTER—OPERATES SMOOTHER

All knives cut the exact same depth within .002" to .003"—setting a new standard for perfect work without chatter marks.

LARGER HEAD DIAMETER — IMPROVED CUTTING ANGLE

3¼-inch diameter head (3⅜-inch cutting circle), 20% larger than conventional 6-inch jointers.

NEW ROTOR-ON-CUTTERHEAD OR V-BELT DRIVE OPTIONAL

BOICE-CRANE NOW OFFERS THE FOLLOWING COMPLETE LINE OF JOB-RATED JOINTERS—

Model No.	Size	Without auxiliary feeding aids, recommended for Stock lengths to	Length being a factor, recommended for stock sizes to	Planes boards and panels to
3400	8" x 84"	8 ft.	8" x 8"	16 in. wide
2400	6" x 60"	6 ft.	6" x 6"	12 in. wide
1400*	6" x 36"	4 ft.	4" x 6"	12 in. wide

* Has cast iron base and table.

THE ONLY LONG-TABLE JOINTERS AT ANY PRICE, WITH FULL-LENGTH, FRONT-ADJUSTING, DOUBLE-LOCKED FENCES

After the fence has been double-locked, depth adjustment is made without disturbing the locked fence.

ALL CONTROLS CONVENIENTLY GROUPED AT FRONT, DESIGNED FOR WORKING COMFORT

Depth of cut control, table locks, direct reading depth scale and switch easily used in a comfortable, normal operating position.

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When rabbetting, guard stays on machine—simply turn and swing out of the way.

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spection has been a vital part of all successful scrap recovery programs. Remember that by the end of 1952, the steel industry will be requiring more than 5 million tons more scrap than in 1950. For more steel, there must be more scrap.

3. **Make Organized, Permanent Salvage A Top-Management Responsibility.** A big burst of enthusiasm may serve the steel production rate right now, but the problem will be continuous. In less than 2 years, the steel industry of America will have added more capacity than the entire steel capacity of Great Britain. This big increase will cause a continuous additional demand for scrap. If this country is to enjoy the benefits of additional steel production, the steel industry will need the cooperation of every top-executive, to see that scrap flows back promptly.

4. **Put Scrap Collection On A "Housekeeping" Basis.** Besides increasing the steel supply, continuous scrap recovery of obsolete machines and equipment reduces taxes through inventory write-off, improves safety conditions, gives lowered insurance rates and clears valuable space.

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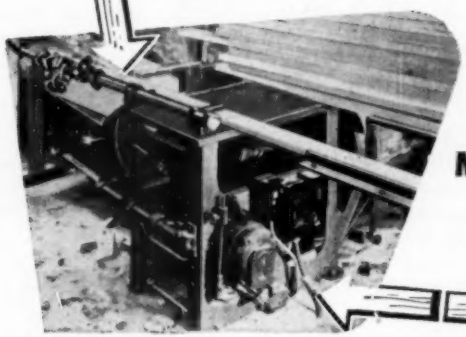

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nol, yet able to pass stringent tests, has been announced by the Chemical Div., Koppers Co., Pittsburgh 19, Pa. Developed at Koppers Petrolia, Pa., plant, the new modified resorcinol adhesive is known as Koppers Penacolite G-1260. It is available immediately to users who can qualify under present government regulations.

The Company says that a major demand for a superior room-temperature setting adhesive exists in numerous armed forces applications where facilities for curing the bond at high temperatures are impractical—such as in construction of plywood PT boats for the navy or arctic huts for the army and prefabricated hangars for the air force. Phenolic adhesives cannot be used here because they require heat curing at high temperatures.

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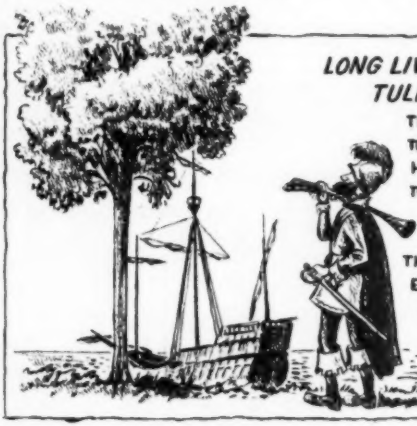
IT IS THE LARGEST OF ALL AMERICAN HARDWOODS OFTEN GROWING UP TO 10 FEET IN DIAMETER AND 200 FEET IN HEIGHT. THE YELLOW POPLAR IS OFTEN CALLED THE "TULIP TREE" BECAUSE OF THE TULIP SHAPED FLOWERS IT BEARS.



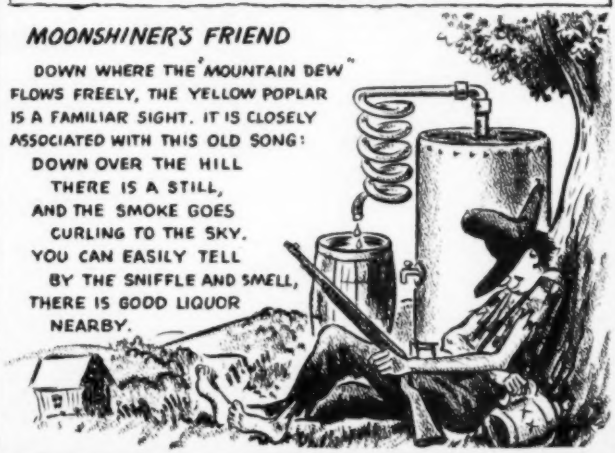
LONG LIVED TULIP TREE

THE HENRY HUDSON TULIP TREE IN MANHATTEN IS BELIEVED TO BE THE ONLY LIVING THING WHICH WAS THERE WHEN THE FAMOUS ENGLISH EXPLORER DISCOVERED THE HUDSON RIVER IN 1609

MOONSHINER'S FRIEND

DOWN WHERE THE "MOUNTAIN DEW" FLOWS FREELY, THE YELLOW POPLAR IS A FAMILIAR SIGHT. IT IS CLOSELY ASSOCIATED WITH THIS OLD SONG:

DOWN OVER THE HILL
THERE IS A STILL,
AND THE SMOKE GOES
CURLING TO THE SKY.
YOU CAN EASILY TELL
BY THE SNIFFLE AND SMELL,
THERE IS GOOD LIQUOR
NEARBY.



HEADQUARTERS FOR HARDWOODS OF ALL KINDS

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Know your wood

POPLAR

BY NED BAILEY

WHEN I went to college back in New York, some forty odd years ago, there was an old poplar tree in Battery Park that the historical society said was there when Henry Hudson discovered the river that now bears his name. It was in 1609 that he sailed up that beautiful stream. So, if it is still standing, and I believe it is, it should be more than 340 years old, which is very old indeed for a poplar.

There are two specie of poplar, both borrowing a name from another specie to add to their own. In the north we have the balsam poplar (Populus tacamahacca, Miller) and in the eastern part of the country we have the yellow poplar or tuliptree as it is more correctly called (Liriodendron tulipifora, Linnaeus).

Balsam poplar is generally found in small, widely separated colonies. It grows from 70 to 100 ft. in height, has a long, straight trunk, and a narrow, irregular open crown with a few large limbs. Its range is from Alaska on the west, to Labrador on the east and being strictly a northern species does best in far northern Canada below the Arctic Circle, where most other trees could not exist. In this area it is by far the largest tree species, growing best in the low river bottoms, banks of streams and borders of lakes and swamps. Under very favorable conditions it will grow as high as 100 feet, with a trunk six to seven feet in diameter.

The balsam poplar in the United States is much smaller, reaching a height of between 60 to 80 feet and an average trunk diameter of 30 inches. They are usually found in small groups and widely separated locations. No branches occur as a rule for 30 to 40 feet from the ground, with a comparatively few large limbs growing directly upwards. Five scales cover the taper-pointed buds, these are saturated with a pungently fragrant, amber-colored balsam. In the drug trade this is called "Balm-of-Gilead" and is used as a part of cough medicine. Balsam poplar has several aliases including tacamahac, cottonwood, rough-barked poplar and Balm-of-Gilead.

The leaves, which are from three to six inches long, are smooth and shining dark green above and pale rusty colored green below, they are egg shaped with long tapering points. Unlike the quaking aspen and eastern cottonwood, the slender leaf stems are round, not flat, simplifying their identification. Before the leaves open the flowers appear, long-stalked catkins with the male and female on separate trees. Light brown hairy seeds are contained in ¼ inch long two-valved, short-stalked capsules.

The bark is smooth and reddish brown with a greenish shade on both limbs and trunks of young trees. Older

trunks eventually become grayish black, are furrowed into deep ridges and are shaggy and scaly on the surface.

The soft uniformed textured wood, has light brown heartwood and nearly white thick sapwood. The wood is light weight and good for boxes and crates because it is light and nails without splitting. The larger logs are often cut into veneer for making fruit baskets. Poplars are used for railroad ties but must be treated beforehand. Some poplar is used to make charcoal but the principal use is for making pulp to be used in paper manufacturing.

Yellow poplar, more correctly known as the tuliptree is one of the largest and most valuable trees of the eastern states. Its habitat is bounded by southern New England through New York to southern Wisconsin, south to northeastern Alabama and northern Florida.

It grows largest and best in the southern Appalachians and the lower Ohio valley. In this area it grows to a diameter of eight to ten feet and a height of more than 150 feet. Occasionally the first branch does not occur for 80 to 100 feet from the ground. It is sometimes called the white-wood tree.

The fiddle-shaped, truncated leaves are clean-cut and glossy dark green. As the name implies the blossom is tulip shaped, large and greenish yellow and orange in color, developing into about three inch fruit of a cone-like dry appearance. The fruit stays on the tree after the leaves have fallen off.

The tuliptree really belongs to the magnolia family. Because of its wood texture it is often called yellow poplar. This tree is of really ancient origin having been recorded in the early history of Europe, Asia and North America.

The yellow poplar wood is light yellow to brown with a creamy white mar-

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CHICAGO 8, ILLINOIS CAlumet 5-5674
IMMEDIATE SHIPMENT — ASK FOR STOCK LIST

It is soft, easily worked and takes paint very well, and weighs only 26 pounds per cubic foot, when air dried. Occasionally, 60 inch planks and wider are produced.

The tree has a wide variety of uses starting with use as a shade tree because of its wide spread and the fact that it is fairly free of pests. The lumber is used largely in construction work, interior finish, manufacture of boxes, crates, baskets, woodenware, excelsior, veneer, plywood cores and a small amount of paper pulp.

The inner bark of both the trunk and root has a strongly acrid bitter taste and is used as a tonic. Hydrochlorate of tulipiferine is also obtained from it, this alkaloid possesses the power of stimulating the heart. Truly a tree with a wide variety of uses.

The End

REVISED CATALOG

A new, revised catalog, issued by the Logansport Machine Company, features the Logan air control valves. The revisions in the catalog provide up-to-date engineering data, illustrations and dimensional drawings on additional valve models plus changes in model numbers.

For a copy write the Logansport Machine Company, Dept. WD, Logansport, Ind.

HELI-COIL MOVES

The Heli-Coil Corporation plans to move all of its machinery, equipment and key personnel from its present plant in Long Island City, N.Y. to Danbury, Conn. The new one-story brick and steel structure will house the firm's executive, administrative and sales offices and its engineering and product-development departments. Ten acres of land are provided for future expansion.

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HARDWOOD FURNITURE DIMENSION

Solid and Glued
Cut to Size
Run to Detail
Superior Machine Work

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BUILDING TRADE REQUIREMENTS

HARDWOOD FLOORING
Unit Wood Blocks
Straight-line Strip
Finished or Unfinished
in
Oak Beech Pecan

RANDOM WIDTH OAK PLANK
Finished or Unfinished

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OAK
Stair Treads, Thresholds
Risers, Glued-up Panels

ARKANSAS SOFT PINE
Satin-like Interior Trim
Paneling, Finish, Mouldings
Sheathing, Dimension

LUMBER COMPANY
of Arkansas
WARREN, ARKANSAS

FULL-AUTOMATIC YET *LOW* IN PRICE!

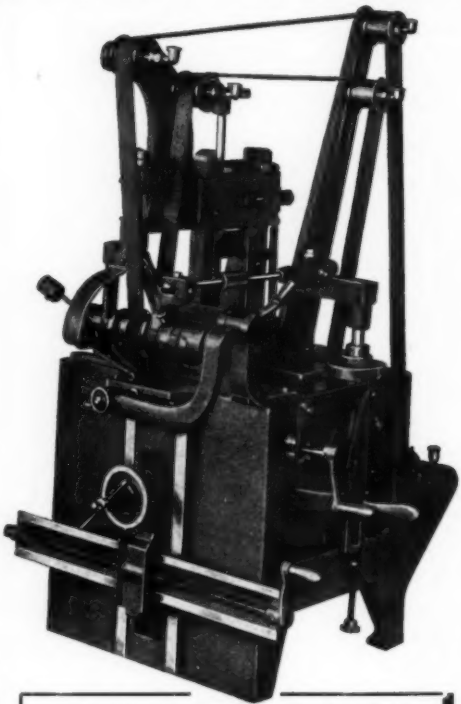
HANCHETT NUMBER 724

AUTOMATIC CIRCULAR SAW SHARPENER

LOOK AT THESE REAL PRODUCTION FEATURES!

This specially designed Hanchett gives you a wide range of service for low-cost, full-automatic sharpening of small and medium-size rip and cross-cut saws:

- ACCURATE ACTION maintains saw teeth of uniform size and spacing—*plus* precision-sharpened cutting points.
- NEW MECHANISM for controlling bevel grind on cut-off teeth is quickly adjustable over a range from 0 to 45° bevel.
- DOUBLE SLIDE HEAD has hand-wheel and screw controls for accurate adjustment of grinding head—both vertically and horizontally.
- ADJUSTABLE TOOTH CAM permits quick selection of the shape of tooth desired.
- GET THE FULL STORY of the "724"—Write for complete data "WW-81."



For rip and cross-cut saws from 6" to 36" dia., with teeth spaced from 10 pts. per inch to 2" spacing.

Remember—Hanchett Builds ALL Sizes and Types of Circular Saw Sharpeners

COVEL SAW SHARPENERS & HANCHETT KNIFE GRINDERS

HANCHETT MANUFACTURING COMPANY

World's Largest Manufacturers of Saw Sharpening and Knife Grinding Machinery

Main Office: BIG RAPIDS, MICH. **West Coast: PORTLAND, ORE.**

MODERN TECHNIQUE *in wood engineering*

BY DAVID MURRAY

YOUNG CURLY-HEADED, chubby Neil Morris runs a big woodworking factory, rising to three floors, in the center of the congested city of Glasgow, Scotland. The first thing that caught my eye when I entered his place was an enormous packing-case newly delivered from the United States. It contained a double end tenoning machine, to match one already on the floor of his machine-shop. There was a good deal of other equipment from America, 4 cutters, 12 spindle horizontal and vertical borers, jointers and automatic lathes. But I also noticed, to name only some items, a hydraulic laminating press from Germany, a rebating machine from Switzerland, and a varied assortment of modern woodworking apparatus made in industrial Scotland.

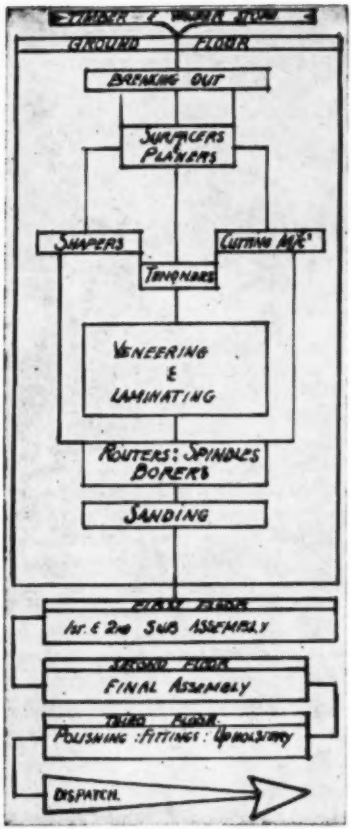
The keynote of the factory is quantity-quality production. That calls for the best machinery wherever it may be found. It also requires plant of special design. Much of the equipment, therefore, is unusual, in the category of "the only type of its kind in existence."

The Planning Office

The firm of Messrs. H. Morris and Co., Ltd., Milton Street, Glasgow, Scotland, was founded in 1902. As it links quantity output with quality control, so it has also managed to bond tradition to modernity. The nerve center is a modern planning office. After designs have been passed, and first drawings and prototypes approved, each job is scheduled in detail. Units, methods, routing and costing are listed, and component sketches are set against each item or process. This gives a complete picture of the materials, operations, machines and jigs required. A sample of the particular unit in hand is supplied to the machine man and gauges are provided to permit regular, periodic testing. After a thorough re-check, the job is set in motion and, of course, is subject to constant inspection.

Accessories For Ships

Having produced what is virtually a new material out of what was probably the first building substance worked by man's hand, the Morris designers go all out to exploit its properties. They have had a wide field in the shipbuilding which is such an important activity of Glasgow and the Clyde. For the cabin doors of the "Queen Mary" and the "Queen Elizabeth," a core of light balsa was contained in an edging of hard wood, the whole being covered on either side with laminated veneer. The result was a handsome solid looking door, which saved about 25 long tons on the dead weight of each vessel. For the luxury liner "Caronia,"



Plan of the Morris woodworking factory. Production is organized for the three floors with the nerve center found in the planning office.

also well known to many traveling Americans, hundreds of "smokadors" or outside ash receptacles were supplied. These were made of semi-cylindrical moulded laminations joined to give a form which would have been impossible to achieve in solid timber.

The Morris developments in laminated wood received a great impetus from the firm's World War II work. It made great quantities of laminated decking for landing craft and played a big part in the development of the famous "Mosquito," the all-wood aircraft. The speed and performance of this aircraft astonished Britain's Royal Air Force as well as the Luftwaffe, and put precision laminated construction fairly and squarely on the map. At present the concern is turning out great rotor blades for the Cierva "Air Horse" twin-engined helicopter. Balanced to a quarter-of-an-ounce for a length of 25 feet from root to tip, the blades have a backbone of compressed wood, with an outer shell of lighter laminated timber, all bonded to a metal hub. In the production of furniture, the firm hitherto has been mostly concerned with large contracts built to custom, such as 1,000 suites for a big hotel or liner.

Britain's "Utility" Scheme

It is now preparing to enter the market with suites built within the price and specification limits of Britain's "utility" scheme. These limits pose problems outside the experience of American manufacturers. The same system of quantity-quality production, using laminated and moulded construction will be followed.

KARDEX CABINET EQUIPMENT

Managements troubled by the sudden expansion of their filing systems will be interested in this 22-page booklet on filing facts. Fire protection, ready expansion and complete marshalling of all fact power within elbow reach are benefits of special value today. Conservation of money, time, effort and space is the basic aim of Kardex cabinet design and installation. There are five types of Kardex cabinets, which include the new, streamlined robot Kardex, described and illustrated which can meet the needs of firms of any size, the booklet states.

For a copy write Remington Rand, Inc., 315 Fourth Ave., New York 10, N. Y.

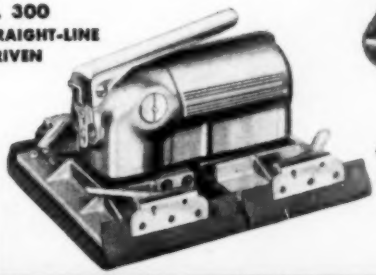
NATIONAL SANDERS

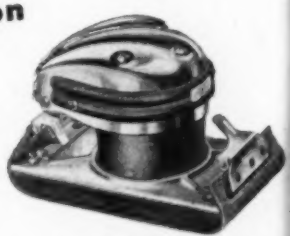
Speed Finishing Room Production

Whether you are rubbing the finish coat, padding in filler, sanding in the white or doing any one of many finishing operations, you will find National Sanders will speed the work and improve the finish. National offers both orbital and straight-line action machines in order to supply you with the type of equipment that will best fill your needs. See your National Distributor, or write us for descriptive literature.

Orbital or Straight-Line Action

MODEL 300
TWO-PAD STRAIGHT-LINE AIR DRIVEN





MODEL 400
ORBITAL ACTION — AIR-DRIVEN

NATIONAL NS SANDERS

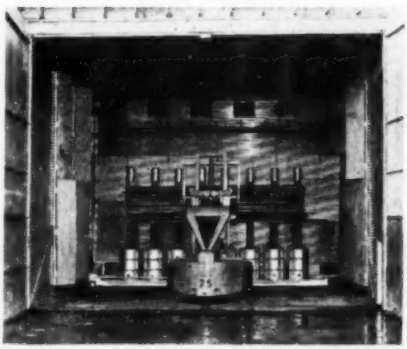
NATIONAL AIR SANDER, INC.
2820 AUBURN ST., ROCKFORD, ILLINOIS

NEW PLANT FOR JONES HARDWOOD

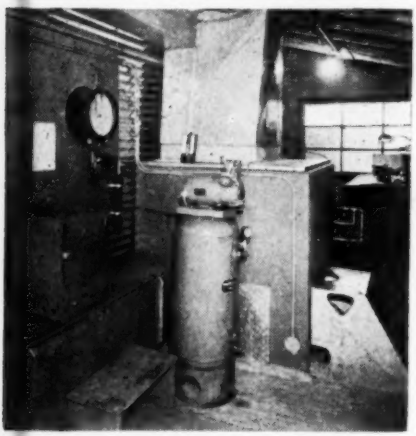
The Jones Hardwood and Plywood Company, San Francisco, Calif.

The first indication of industry observed by Southern Pacific rail passengers approaching San Francisco from the South is the new plant of the Jones Hardwood and Plywood Company. Located on a 3½ acre tract, spur track served, they have been serving Northern California manufacturers and consumers of hardwoods for almost 30 years.

The Jones Hardwood and Plywood Company is owned and operated by Nelson E. Jones who started in the hardwood lumber business in San Francisco in 1912 and organized the present company in 1922. Nelson Jones is well known to many manufacturers and consumers of hardwood lumber and plywood in the United States as well as in many foreign manufacturing centers.



Kiln is loaded and discharged by means of a Hyster forked lift truck, taking stock that has been accurately piled on jigs to insure exact spacing of stickers.



Control room. Foxboro instruments, Worthington compressor, electric oven and electric testing meter for maintaining temperature and humidity, scientific testing and control of moisture content of lumber in process of drying.

In addition to carrying ample stocks of practically all varieties of commercially used hardwoods, the Company has cars continuously being loaded with hardwoods and plywoods at the principal producing centers in the United States. Mahogany and other varieties of their products from the Philippines, Africa, and Central America or ash, oak and birch from Japan are received by the firm. These imports and domestic shipments are sorted, dried, and delivered to the consuming trade on an efficient and economical basis.

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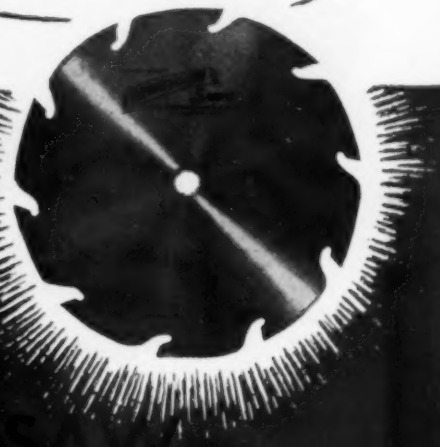

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The deep well of experience which enables Reliance to deliver the right finish for every job, can only be measured by the satisfactory performance of the finishes we have developed for many of the country's leading manufacturers.

If you have a finishing problem, we are ready to work it out for you. Our imagination and resourcefulness can probably help you find better, quicker and more economical methods and materials to boost your sales, increase your production and better your product.

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For additional information address 4732 Crittenden Dr., Louisville, Ky.

ELECTROPLATING
Wood Products

By Thomas A. Dickinson

AN unusual metallizing technique now used by Warren Plating Company of Los Angeles permits the finishing of wood and other non-metallic products with smooth metal coatings which are very durable.

It is, briefly, a method of conductively coating and electroplating those non-metallic surfaces on which metal finishes are required; and the plated products may be coated completely or in localized areas, depending on the circumstances.

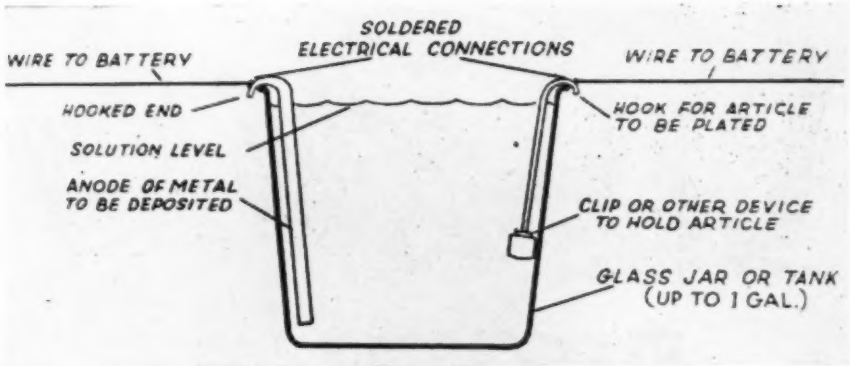
Economically speaking, the process is more expensive than methods of using pneumatic-spray guns to apply molten alloys to non-metallic surfaces. However, the plated coatings lack the roughness and porosity of sprayed-metal coatings and can be applied for better adhesion without danger of warping or charring the basic materials.

The conductive coatings which permit the subject plating operations normally comprise large quantities of brass or copper powders dispersed in clear lacquer. Both powders and lacquer components are conventional organic finishing materials, available from most paint dealers, and the mixing ratio by weight comprises about 100 parts powder and 25 parts lacquer.

A thinning solvent is added to the latter mix so that the conductive coating can be applied with a standard paint spray-gun.

When all surfaces of a product must be electroplated, the conductive coating also serves as a protective primer—preventing deterioration of the basic materials in the electrolytic plating solution. But when only localized areas must be plated, the product is usually primed all-over with a clear lacquer coating so that the conductive coating can be applied via stencils or masks in a second finishing operation without subsequently requiring the exposure of unprotected surfaces to plating acids.

Lacquer is used as the primer and metal-binding medium because of its chemical inertness and quick-drying



Schematic diagram showing details of a small electroplating tank for experimental work.

qualities. However, other organic coating resins could be used in place of lacquer for both purposes if necessary.

Special metal fixtures permit the attachment of conductively-coated articles to negative power terminals, so that each article will function as a cathode in the plating bath. Anodes, of course, comprise the metal to be deposited in each different circumstance; and, generally speaking, copper is the most effective deposition.

Plating solutions are normally the same liquids that are used to electroplate metal products. For example:

Copper Plating Solution

Commercial sulfuric acid ..... 6 oz./gal. water
Copper sulfate ..... 40 oz./gal. water

Nickel Plating Solution

Nickel sulfate ..... 14 oz./gal. water
Ammonium chloride . 2 oz./gal. water
Nickel chloride ..... 2 oz./gal. water
Boric acid ..... 2 oz./gal. water

Chromium Plating Solution

Chromic acid ..... 33 oz./gal. water
Sulfuric acid ..... 1/5 oz./gal. water

Cadmium Plating Solution

Cadmium oxide ..4-2/10 oz./gal. water
Sodium cyanide ..... 10 oz./gal. water

Gold Plating Solution

Metallic gold fulminate ..... ½ oz./gal. water
Potassium cyanide .... 2 oz./gal. water

These solutions are respectively mixed with distilled water, and have been used for plating purposes (as indicated in accompanying illustrations) in acid-resistant tanks with capacities ranging from one to several hundred gallons.

Sufficient power for experimental work in glass tanks containing only one or two gallons of plating solution has been obtained from standard six-volt batteries. Production plating is usually done with transformed and rectified current from an alternating power source, and with motor-driven solution agitators.

Plating time requirements are varied in conformity with the thickness of the metallic coating which must be deposited on each different product, and in most cases non-metallic surfaces require metal coatings with more thickness than the 0.003" to 0.005" deposits which are normally plated on metal products.

Electroplated coatings have been ap-

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Plaskon offers you a complete line of TRIPLE-ACTION Hardeners to allow you more freedom in adjusting your formula during use. These Plaskon TRIPLE-ACTION Hardeners contain a combination of ingredients which produces (1) Stronger bonds, (2) More moisture - resistant bonds, (3) Lower glue-line costs. Let us send you complete data on Plaskon Liquid Glues, both low- and high-solids types, for hot and cold press operations. Drawings of typical unloading and storage arrangements for users of tank shipments included if you wish.

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More for your Money in Plaskon Powdered Glues, too

. . . thanks to *Triple-Action* Hardeners

The same TRIPLE-ACTION Hardeners now supplied separately with Plaskon Liquid Resin Glues have been used for years in the scientific blending of Plaskon *Powdered* Resin Glues. Their performance has helped create the preference which has made Plaskon the world's largest producers of resin glues in powdered form.

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RESIN GLUE

Production electroplating tanks in use at Warren Plating Company, Los Angeles.

plied to wood and other non-metallic products where unusually durable and attractive decorative effects were required; but, on the whole, electro-deposition techniques are regarded as most practical where functional coatings are required. For example:

(1) Wood patterns have been metallized by plating so that they would have the heat resistance, chemical inertness, and surface-release qualities which would permit the casting of molten mold materials thereon. Such patterns were made to a shrink scale to allow for the deposition of metallic materials where close dimensional tolerances were essential, and the build-up of deposition metals is said to have been so uniform that even the finest details of small wood carvings were reproduced on the metallized patterns.

(2) Production mold cavities of the types used in making sawdust casts and plywood moldings have been made by the electro-deposition of metals on conductively-coated wood patterns. The conductively-coated pattern surfaces were waxed so that the patterns and cavity shells could be separated after the plating operation, and the cavity shells were in some cases reinforced for production purposes with cast alloys.

(3) Wood form blocks for the molding of plywood with dielectric heat have been shielded by electroplating so that they would have good release qualities and enough electrical conductivity to make full use of output energy.

(4) Where the weight of solid-meta articles would have been too great, and the surface-hardness of non-metallic articles would have been too slight, electroplated wood products have been satisfactorily used—for example, in the manufacture of aircraft.

(5) In the manufacture of plywood panels, when it was impractical to use wires or similar conductors for electricity between the laminate layers, core segments have been electroplated for use as the required conductors, to which wire terminals could be soldered at the panel edges. Facing veneers and glue, of course, served as insulators for the electroplated conductors.

(6) Plates for printing and stencils for the spray-painting of contoured product surfaces have been built up by electroplating wood and other non-metallic masters, which were conductively coated and lubricated as noted above.

(7) Electroplated wood and plastic housings have been used in the assembly of extremely delicate instruments, whose accuracy and longevity depended on housings with metallic strength plus non-metallic thermal-insulation properties.

Although they do not require the extensive machine operations which are needed to increase the brightness and dimensional accuracy of alloy-spray coatings, electroplated coatings can be drilled or otherwise machined, if necessary, with less difficulty than has

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The growing preference is the PYRO CELLO-FILM—the ideal finish for combining exceptional beauty with amazing toughness. PYRO CELLO-FILM not only adds to the appearance of all fine woods, it also gives remarkable protection against *scratches, bumps, fats, saline solutions, greases, alcohol, acids and hot or cold liquids.* Find out right away just why PYRO CELLO-FILM is the superior finish for your wood products!

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MANUFACTURERS OF VARNISHES — PAINTS — STAINS — LACQUERS — SYNTHETIC ENAMELS — CELLO FILM — SOLDERING FLUX AND SPECIAL COATINGS.

been experienced with sprayed metal finishes—not only because metals and non-metals can be bonded by plating for greater strength, but because plated metals have no natural tendency to be extremely hard and brittle.

Alloy-spray coatings have been used in some circumstances as conductive coatings for electroplating purposes; but, according to Warren officials, this involves a rather tedious procedure which tends to combine—rather than to eliminate—the disadvantages of the spraying and plating techniques.

The End

HOW TO IMPROVE YOUR WOOD FINISHING

"How to Improve Your Wood Finishing," title of a new bulletin recently prepared by Sundstrand Machine Tool Company, is of vital interest to those concerned with obtaining better wood finishes. The colorful 4-page bulletin is virtually a manual on wood finishing, containing as it does a detailed analysis of the five important steps commonly employed in sanding.

Includes such details as abrasive paper and grit specifications, type of pad to use, when and how to use sander with grain, cross-grain, etc. Wet and dry sanding operations discussed include: white sanding, wash coat sanding, padding filler, sealer sanding and final finish rubbing. An added feature of the bulletin, the "quick check chart" gives a complete listing of specifications for the four models of Sundstrand Air Sanders. Presented in tabular form, the chart enables the user to select quickly the type of sander which is best fitted for a given job.

For a copy write the above Company, Dept. WD, Rockford, Illinois.

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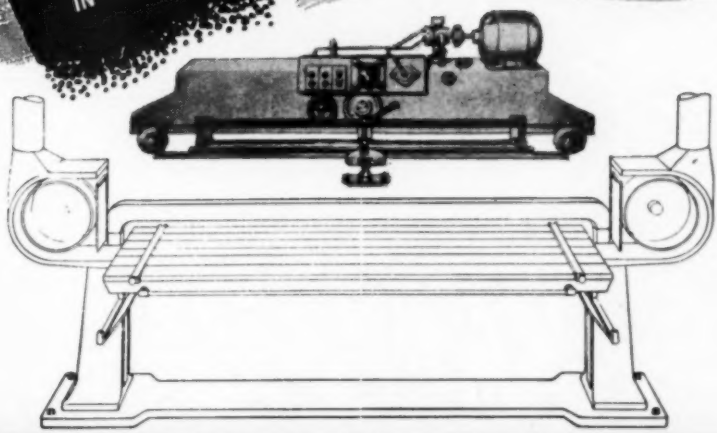

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LINCOLN PARK INDUSTRIES, INC.

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THE TREE BEHIND THE TREE

The tree behind the tree is the tree you never see. It's the margin of waste that is being redeemed by *Resineering*. Great-advances are being made by applying engineering principles to improve wood, paper and pulp products through the use of BAKELITE Phenolic, Urea, and Resorcinol Resins.

Here are a few examples, in brief, of getting more out of our forests through *Resineering:*

Resin adhesives are employed for the gluing of fine furniture, exterior and interior grades of plywood, and marine and aircraft sections.

Wood aggregates using these resins as binders, are molded into furniture and structural components and into boards having many uses.

Resin-treated paper stocks acquire new properties, such as strength and moisture-resistance, that permit their use as masking and surfacing sheets for plywood. A related development—resin-impregnated crossbanding sheet—upgrades plywood by hiding knots, cracks and other imperfections, and minimizing warpage.

Pulps reinforced with resins added at the beater, are further processed into such products as wet-strength paper bags, rigid building board, and preforms for molded plastic products of high impact resistance and fine surface finish.

Treated paper is formed into rigid honeycomb cores that provide extremely high strength-weight ratios for such uses as aircraft flooring, truck paneling, furniture, fixtures.

These examples of *Resineering* applied to wood, paper, and pulp products may suggest answers to some of your problems. Address inquiries to Dept. CH-27.

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*Name on request

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GUN STOCKS . . .

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. . . OR GOLF CLUBS

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Consult our engineering department for suggestions as to whether and how our hot spray lacquers may be adapted to your finishing problems.

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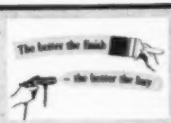

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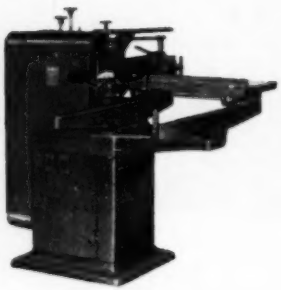

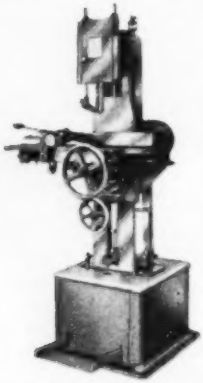

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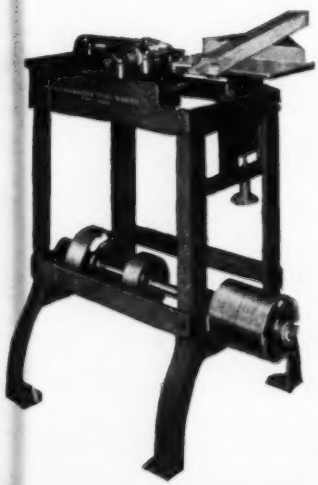

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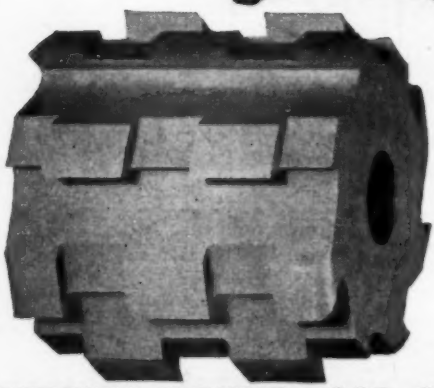

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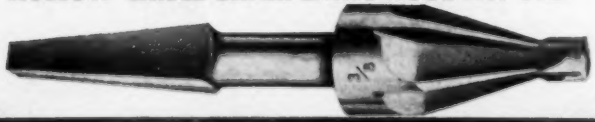

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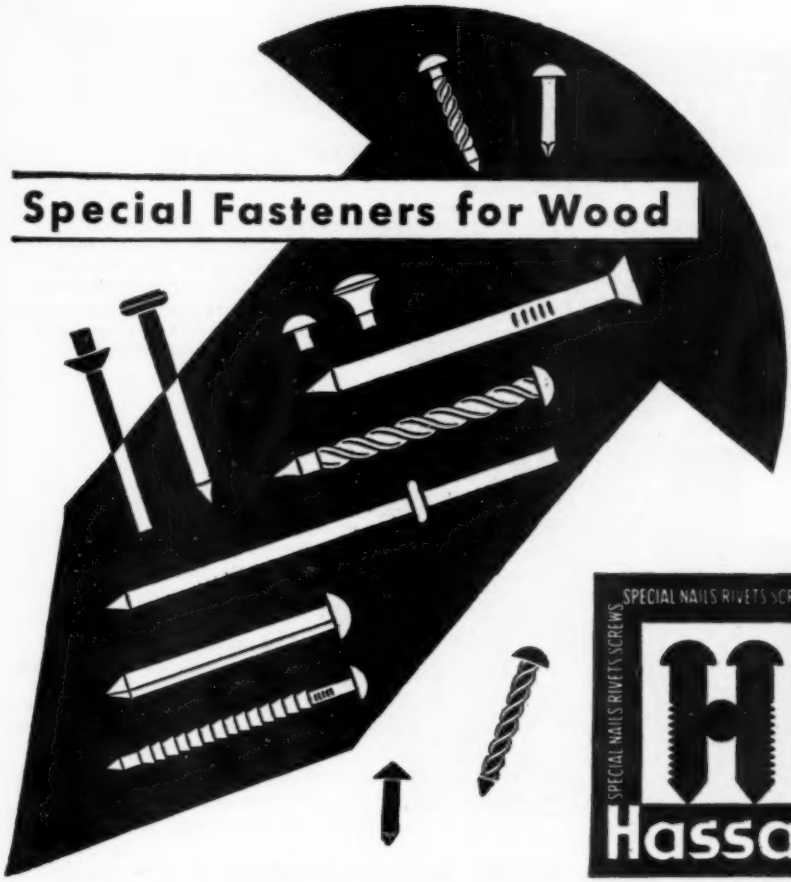

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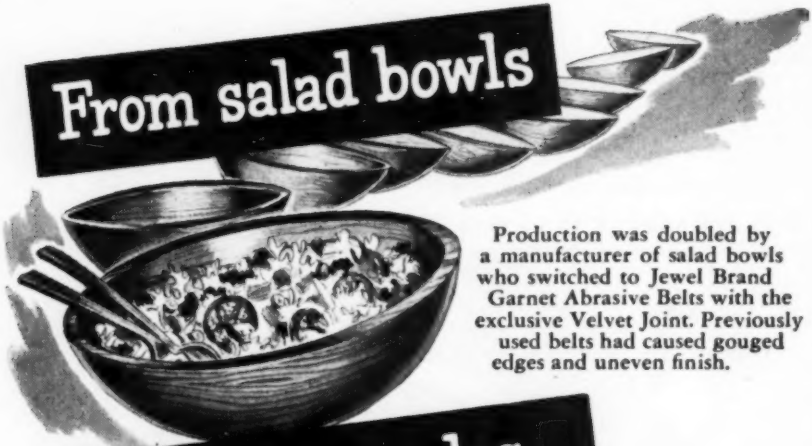

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GLUING

As A Factor Affecting FINISHING

By L. E. Clark, Jr.

Finishing operations, in our thinking at any rate, are too often limited to lacquers, stains, etc. However, these very finishes and the success of them are dependent upon earlier manufacturing operations. In past issues we have presented material on surface preparation in sanding. Now we go even beyond that point to finishing defects caused by faulty gluing. This article is one of several presented at the 1950 sectional meeting of the F.P.R.S. at Syracuse, N. Y.

MANY of the problems here presented may seem elementary to some wood fabricators, but they have been chosen because they are known to exist in some plants. The analyses and solutions of some of the problems considered are theoretical and it is entirely possible that there may be some disagreement.

Glue is an essential part of plywood and furniture fabrication, but it certainly does have its quirks and problems. In previous panels the behavior and special consideration to be applied to each type have been discussed. There are no "faultless" adhesive materials, but most of them, when applied properly under the right conditions do a fair job of holding wood.

Surface discolorations are probably the biggest problems encountered in fabrication of veneered work. This may be caused by an actual penetration of the adhesive through the pores of the wood, or it may be a result of leaching or soaking of water through the faces, the water having dissolved in it undesirable reagents which cause stains to develop. The most prominent penetration takes place in oak, mahogany and walnut faces or in those of other open grain species—particularly where highly figured crotches, burls, etc., are involved—that offer considerable end grain to the glue line and face. With vegetable and casein glues, this discoloration takes the form of dark stains, caused by a chemical reaction between certain compounds in the wood, and the free alkali in the glue. In the event that stains have developed, a dilute solution of hydrogen peroxide or oxalic acid will generally remove the discoloration.

As a general rule, sanding has little beneficial effect, because the stain has penetrated from the glue line to the face, dyeing all the wood fibers in between. If the discoloration is only on the surface, due to finger marks, etc., it will usually come off in sanding.

To eliminate this trouble, two courses of action may be followed. In one instance, a reduction of the water used in the mix will make for a heavier

Mr. Clark is with the Perkins Glue Co., Lansdale, Pa.

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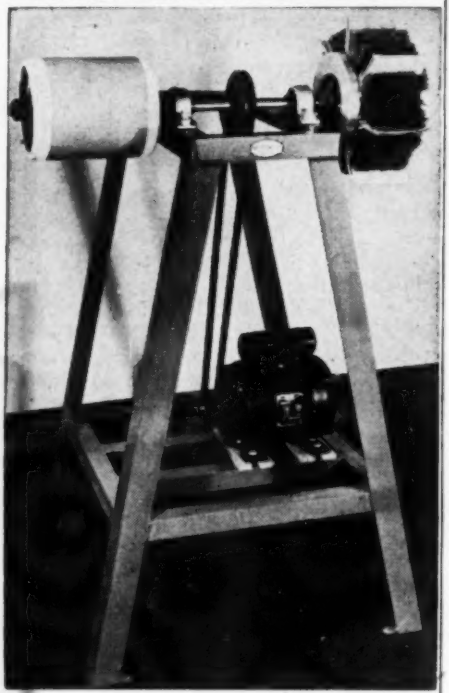

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bodied glue which will not penetrate easily and the other is to change the type of glue being used. In the case of casein glue, veneering grades are formulated with low free alkali, which will reduce the staining problem.

When the surface discolorations are due to resin penetration, this problem can usually be overcome by the addition of walnut-shell flour to the glue mixture. The substitution of walnut-shell for 10 or 15 parts of the wheat flour used will help to plug the pores of the wood and prevent the glue from coming to the surface.

Sanding will remove most of the resin, as the large blot frequently has spread from a small pore or crack, and will not amount to much after the surface has been sanded. In any event, bleaches will not help as the glue is impervious to water and will not react with the bleach solutions. The resin spot formed will not take finish too well and should be avoided by the use of shell filler in the glue mix.

Workmen should be cautioned against handling veneers with glue on their hands, as many unsightly panels result from surface markings traceable to such carelessness.

Frequently, well finished furniture panels will show bars on the surface. These are not the customary "bleed through" blotches, but seem to follow a definite pattern at right angles to the face grain. In most instances, this is due to wavy cross bands being used under the face ply. Assuming that the cross band is uniformly spread, the glue on the high spots, or "tops of the hills," is pushed to the side into the low spots when the panel is placed under pressure. This results in an increase in spread at the low points which is forced through the face, leaving a regular pattern of bars on the faces.

To overcome this difficulty the glue may be thickened by the addition of

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walnut-shell or wood flour to help plug the pores and to make the glue less mobile on the cross bands, or, of course, sliced veneer instead of rotary cut may be used. Since this defect usually shows on fancy faces, it is worth the expense and effort to use sliced veneer when the trouble is noticed.

Another surface defect, which is quite common, usually does not show up until the panel is finished. Reference is made, of course, to sunken joints. Most of this can be traced to surfacing the cores too soon after gluing. A certain amount of water is added to the wood at the glue line which causes it to swell slightly. In addition to the swelling, there is also a softening of the wood fibers at the glue line and, with the edges under pressure, these are forced above the normal plane of the surface. If the moisture at the glue line is not allowed to diffuse into the cores before they are surfaced, the high points are cut away. Therefore, there is less wood at the joint than at the time of gluing. Later the moisture is diffused into the wood and the swollen fibers return to normal. Some of the wood is now missing which results in a sunken joint.

Do not be misled by claims that the cores may be machined as soon as the glue is set. This applies to either rotary-clamp or high-frequency techniques. Two or three days should elapse between gluing and surfacing, and plants that observe this rule seldom have trouble with sunken joints.

Another surface defect results from too much glue smear on the cross band from tapeless splicing. This results in a poor bond between the face and the cross band, as glues do not take well to smeared resin surfaces, and in addition, the added thickness of glue will cause raised ridges to show through on the

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face. Careful control of the glue spread at the splicer, whether pre-applied or at the splicer, will eliminate this trouble. The amount of glue used in splicing should be just sufficient to bond the veneer and never enough to produce a smear on the surface. Many people are careful about splicing the faces, but are less cautious with cross bands. Care is needed here too, or ridges will show through to the surface.

Although one generally thinks of finishing as involving the use of lacquer, stain or varnish, certain industries glue fabric to panels. These often notice that the color or the fabric may change shade when glued to resin-bonded panels. This is due to free formaldehyde, which is a gas, penetrating through from the glue-line. When using fabric on resin-bonded panels, one should specify that the dyes used be formaldehydefast.

Some of the points which affect finishing from a gluing standpoint have been briefly covered here. It is hoped that at a future time we can present others to WOOD WORKING DIGEST readers.

The End

CATALIN BULLETIN

Catalin synthetic resin adhesives are featured in an illustrated 8-page folder issued by the Catalin Corp. of America. A ready reference table gives specific and useful information on the designation, description, application, recommended accelerators and specifications of each resin. A section is devoted to the successful use of urea resin adhesives which includes selecting the formulation, mixing, spreading, moisture content, pressure and temperature.

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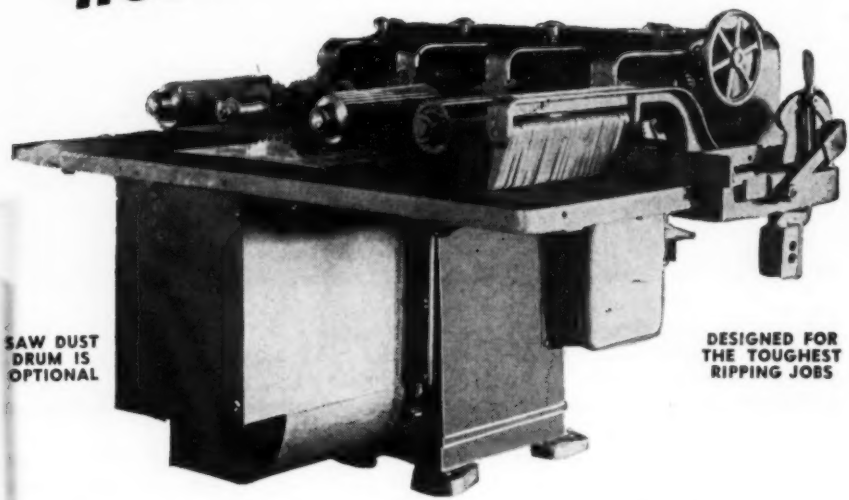

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Available for direct motor or V belt drive.

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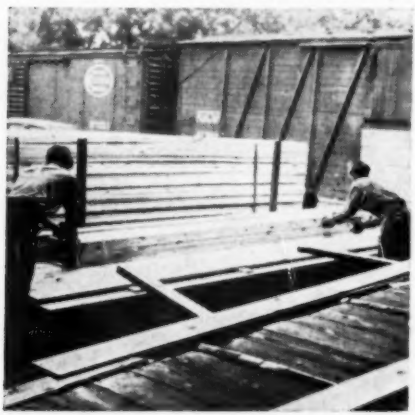
PACKAGED *lumber streamlines handling*

This method of strapping lengths of lumber together gains in popularity. There are adaptations of it that can be made to various other wood products: shingles, sash, etc. Possibly there are still other products that can be handled more economically with this streamlined method.

MECHANIZED methods have come to the lumber industry through the adoption of sound materials handling principles.

Success of several large lumber yards and saw mills in pioneering efficient handling techniques has led to the widespread use of the lumber package. Since the introduction of the package, lumber loading and shipping have been streamlined and work made easier.

Conveyors have been installed at saw mills to set up a flow of sized lumber from cutter to bundling station. At the end of the conveyor, boards are stacked and strapped in units convenient for fork truck handling. Once packaged, the lumber can be easily transported by rail, truck or ship.



At the end of conveyor line, boards are quickly stacked.

Strapped packages are doubly advantageous at point of destination. Anyone who has received loose loads of lumber realizes the labor involved in prying apart interlocked boards and unloading that car. Packaged lumber, however, is easily removed by crane or lift truck, cutting unloading time to a fraction.

Parallel to the improvements in mill to manufacturer shipments is the handling progress in the lumber yard. To eliminate the labor of plank-by-plank stacking and the danger of boards falling upon workers, many yards have turned to strapped lumber. Retailers have also found that strapping green lumber prevents it from warping and twisting.

Perhaps the primary advantage to the retailer is the merchandising power of the package. Stacked in tallied units,

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This article is reprinted from "Confab," published by the Acme Steel Company, Chicago.

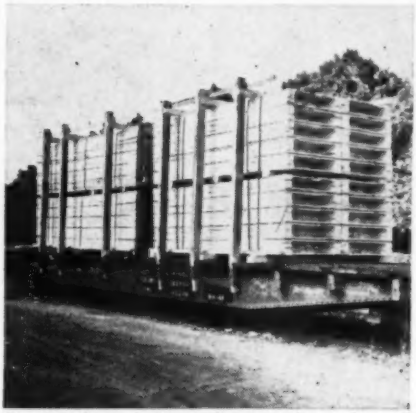
As soon as all bundles are in place, Unit-load band is applied.

bundled lumber stimulates package sales. Rather than strapping arbitrary quantities, retailers often check past purchases to learn their average unit of sale. Weighing this factor against the most convenient unit for handling and shipping, the quantity per package is determined.

Contractors, in particular, prefer to buy strapped lumber for delivery to building sites. With pilfer-proof straps, the lumber can remain at the site safely until construction begins. Since contractors generally estimate a loss of 5% of the lumber through pilferage and breakage, they save considerably by package buying.

Bundles are deposited at the site compactly, as compared with the old method of scattering the load over the ground. If dump trucks are not available, retailers use their regular delivery truck. Trucks are quickly braked until the load slides to the rear of the vehicle. Then the truck is started suddenly, dropping the load at the proper spot.

Strapped lumber is carried by fork truck to flat car.



Strapped and braced car of packaged lumber is ready for shipment.

Strapped lumber permits the retailer to better utilize yard facilities and the mill to gain more productive man hours. To the worker, it offers safety and ease of handling, as heavy man loads become light fork truck loads. To the customer, it means increased satisfaction. Not only is the package principle becoming standard practice, but it is being applied to shingles, sashes and other products handled in the lumber industry.

The End

Needles of sugar pine grow in clusters of five and are three or four inches long.

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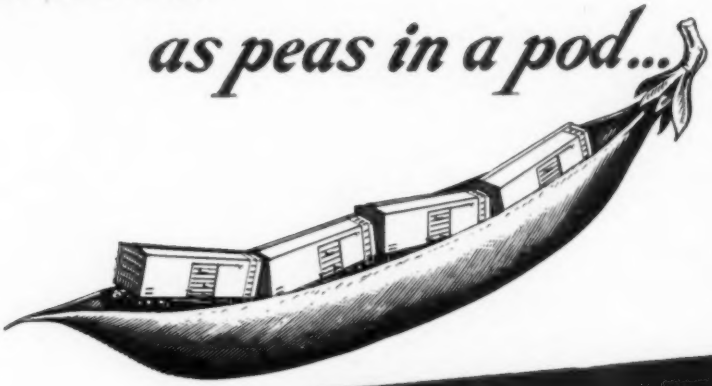
VENEER, PLYWOOD AND LAMINATED WOOD SECTION

FEATURES

A Modern
Plywood Plant
Veneer and Plywood

alike

as peas in a pod...



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QUALITY VENEERS SINCE 1910 STOCKTON, ALABAMA

A MODERN PLYWOOD PLANT

By G. A. Seidel

THERE was a time when "What was good enough for grandpa is good enough for me" was the slogan of the wood working industry. No longer is it heard —in fact, most of its exponents have either modernized their plants or gone out of business! Now when a new plant is built all the engineering know-how available is put into the selection and layout of machinery, equipment and handling, as well as the physical building itself. A modern plant of this type was built several years ago, for the manufacture of hardwood plywood at Ashland, Wisconsin, by the Splicedwood Corporation, with their general offices at Mellen, Wisconsin.

The plant was laid out to take full advantage of a continuous flow of materials through the various processes required in making high quality hardwood plywood by the cold banding process. The building, which is 300′ x 200′, is divided by a firewall, with the operations pertaining to the veneer preparation taking place on one side, and the pressing and plywood processing being done on the other side. There is a 16′ ceiling and monitors 24′ high. Walls are of concrete block construction, and the ceiling is of locked steel sheets with 1″ insulation board, and tar and gravel roofing. The floor is a 6″ concrete slab, and all framing members are steel.

The easy movement of material in and out of the plant is assured by one indoor and one outdoor rail siding, each accommodating three freight cars. There is also a large indoor truck dock, which accommodates two large trailer vans or trucks.

Raw veneers are stored at one end of the plant until they are needed for production. The first operation required on the veneers is clipping to specified widths. Then the jointing is done on two Diehl jointers, from which they go to the lay-up table, where the veneers are matched. The lay-up is done on tables directly behind a battery of six Diehl splicers.

After the veneers are spliced, they are sized or trimmed on two especially designed and constructed veneer sizing saws. The veneer is now ready to be pressed, except for one thing.

And here let me call attention to a very modern and worthwhile deviation from the ordinary procedure that Splicedwood Corporation have added to help them produce better plywood. They have installed a tempering room, which they have under control at all times. Before the veneer is pressed, it is "conditioned" in this veneer storage or tempering room, in order to have all veneers of the same moisture content before being pressed into plywood. To accomplish this, the tempering room has a year round humidity control system.

Heating of the veneer storage or tempering room is accomplished with

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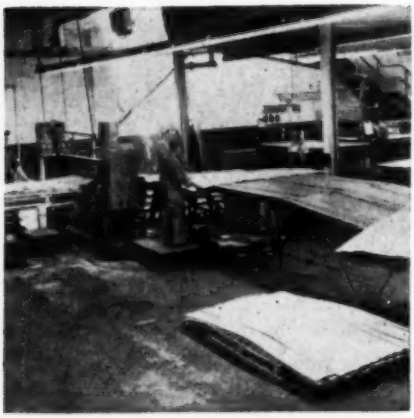
Mr. Seidel is vice-president of the Splicedwood Corp., Ashland, Wisconsin.



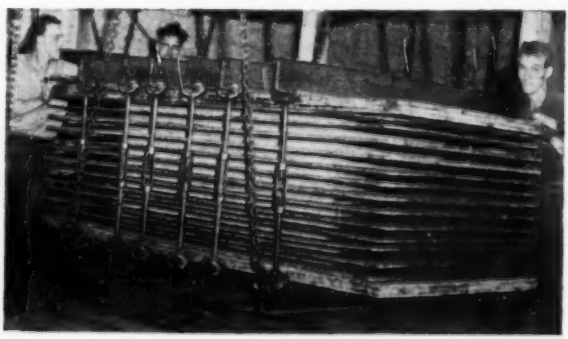
Press room with face and back conveyors in the foreground.

unit heaters so that the winter temperature is maintained at 70°F. When the summer humidity in the room is too high, the unit heaters are used to raise the room temperature and thus lower the relative humidity. In order to accomplish this automatically, the heaters are controlled by a humidistat, so that when the humidity rises above the desired point, the heaters are turned on. No moisture is taken from the air by this process, but the warmer air has a lower relative humidity.

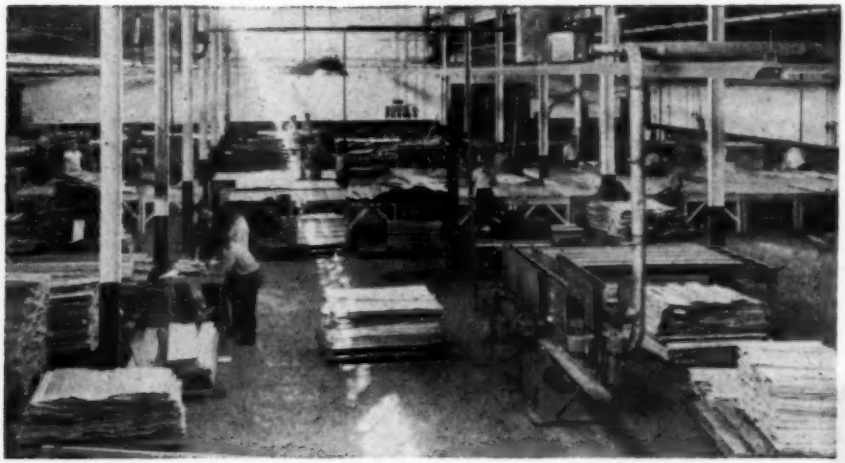
During the long winter season in Wisconsin, there would normally be an extremely low humidity in the room without the addition of moisture. Air at low temperature enters the room, due both to leakage and ventilation. This cool air is heated to room temperature, and in the process its relative humidity becomes quite low, so that the veneer in the room would tend to give up its moisture to the air. In order to maintain the desired moisture content in the stock, Bahnson centrifugal humidifiers have been installed.

Four humidifiers have been located in the room, which has a volume of 112,200 cubic feet. Each unit will evaporate up to eight gallons of water per hour, using a ¼ hp motor to both evaporate and distribute the moisture. In this unit, water is broken up into a very fine mist by centrifugal force, and the fan, which is an integral part of the unit, handles about 2,300 cubic feet of air per minute to pick up, evaporate and properly distribute the moisture. Ordinary city water is fed to the units, two of which are shown in position in the veneer room. The only services required at the installation are water supply, drain, and electrical connection for the motor.

An important part of any humidity control system is the distribution of the evaporated moisture in such a manner that the humidity will be uniform throughout the room. The four units used in the tempering room have been



A bale of laid-up plywood being placed on the overhead conveyor which carries it into the curing kiln.

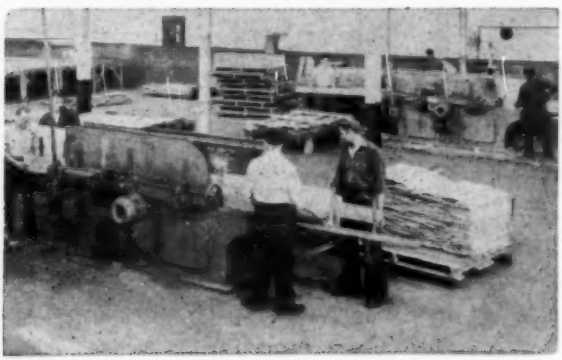


Veneer processing department.

located to produce a directional flow of air around the room, and to provide complete coverage of the room area, so that uniformity will be obtained.

The units are automatically regulated by the Bahnson Master B humidity control. The humidity sensitive element is located in the control box mounted on one of the columns, and regulates the water fed to all four units in accordance with the requirements of the room. The control box itself contains a small aspirator fan, which provides a constant flow of air across the sensitive element, so that it can sample the room air continuously. The element consists of several strands of specially treated paper which gives an accurate response to changes in relative humidity.

After the veneers have been conditioned in this tempering room, they are pressed into plywood by a cold press operation. There are two press lines, one with a 4′ x 8′ press for stock panels, and the other 3′ x 6′ small size and dimensioned furniture panels. The core or crossbanding veneers are put



Jointing is done on two Diehl jointers.

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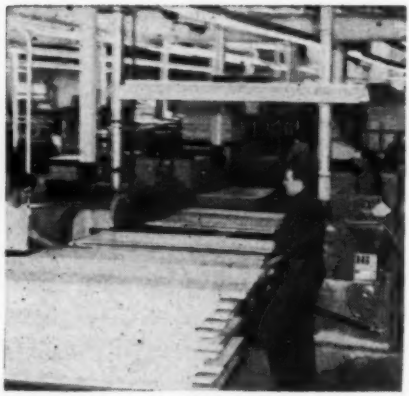
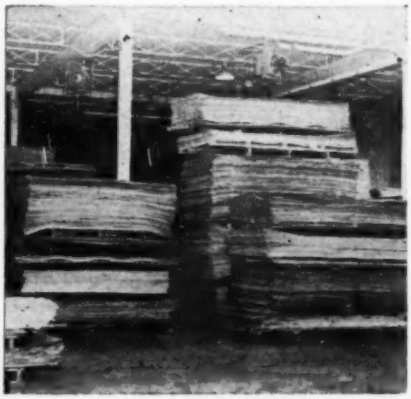


Panels being end trimmed.

through the spreader with the faces and backs being conveyed to this position, where they were laid into the lay-up box on caul boards. Each caul board is then conveyed to a lift next to the press, where the pack and bale is made up. When a press load has been made up, the lift is raised and the pack is pushed into the press. Pressure is then applied and retaining clamps placed on the bale. From the press it is lifted onto a truck, which carries it to an overhead conveyor. It is attached to the conveyor, which carries



Veneer storage or "tempering" room.

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Get Maximum Production with Minimum Manpower

• Here is high efficiency with a small investment . . . fast production of glued-up lumber cores, tops, panels, etc. . . . maximum output of quality plywood . . . at lowest cost. If you want to put your production on a high profit basis, get the facts about this modern equipment. Write today for literature.

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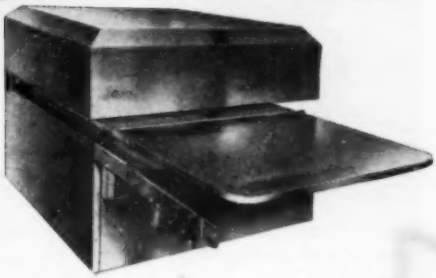

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PLYCOR TYPE BVH HYDRAULIC HOT PRESS

• This compact, ruggedly built plywood press is engineered for finest quality production at low cost. Easy to install . . . requires no pit. Operates on either high or low pressure steam. Equipped with automatic electric pressure control. Available in 100" x 52" size, loading from 100" side. Made with 1-2-3-4- or 5 openings.

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Sawing and sanding department with panel storage area in background.

it through a curing kiln, which is operated at an elevated temperature to speed the cure of the resin glue.

Upon removal from the kiln the bale is again placed on a truck and transported to an area close to the press to be broken down, to minimize the handling of the clamps, caul boards, and head boards.

The panels are then trimmed on two trimming saws, one of which trims the sides and the other the ends.

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FAST ACCURATE CUTTING

Straight, Sharp Glue Joints • cross or with grain

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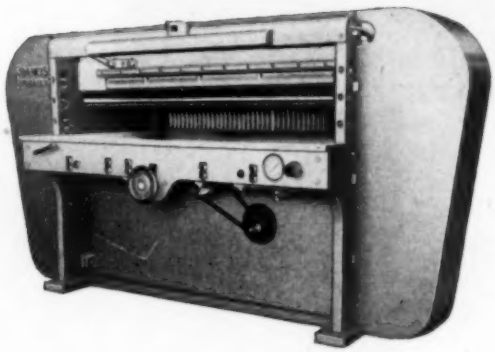

The New Francis Hydraulic Precision Cutter incorporates many features discovered under practical, production procedures in the plants of America's leading veneer and furniture manufactures.

Designed, developed and engineered for durability, the Francis Cutter has been tested and proved on America's production lines. It is sturdily and rigidly constructed, accurate to 1/64 cuts. It delivers sharp, straight glue joints on veneers up to 90 inches in width and in bundles 7" thick.

Its "easy-to-read" scale is illuminated by a flood light on the front cover. With three 20" long scales on the front section of the cutter table, a magnified depth scale of 1" wide by the depth of the machine, is graduated in 1/16", plus a master scale for positioning back feed bar, assures easy and accurate measurement for precision cutting.

The hold down bar is hydraulic pressure operated and is adjustable from a maximum of 7" to a minimum of ¾" wide clamping area. The back feed bar is electrically driven, but can be manually operated for fractional cuts.

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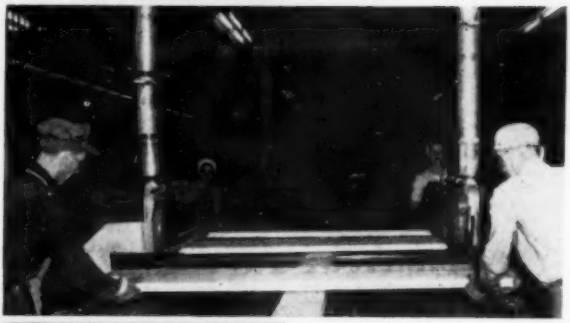
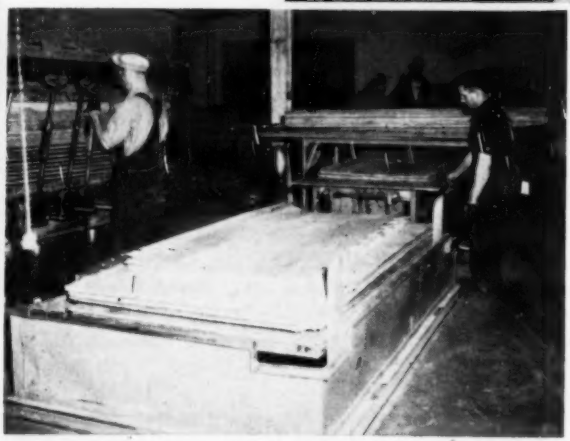
ALSO, MIXERS—SPREADERS HOT AND COLD PLATE PRESSES

A view of the tempering room showing Bahnson humidifiers in use.



Trim saw operation. The machine is a Challoner.

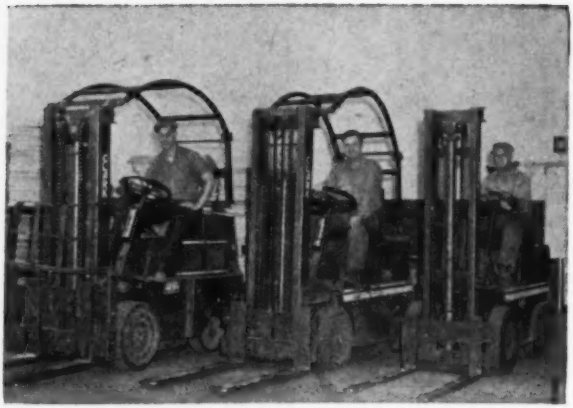


Assemblying the bales for press.

Veneer passing through the spreader feeder.

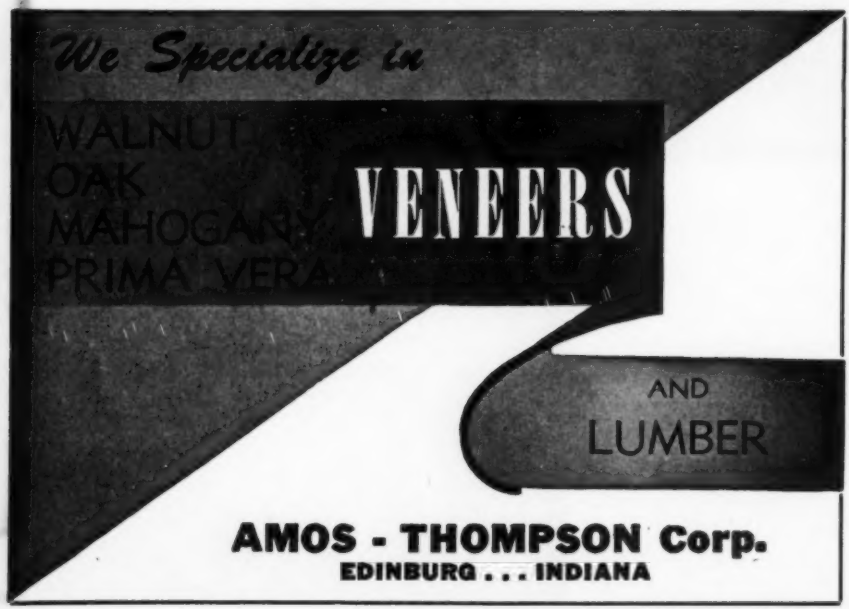
Stock passing.

Core lay-in.



Clark lift trucks used for materials handling.

After the panels are sized they pass on to the sanding department, where one three drum and two four drum endless bed sanders are operated. A Wysong-Miles hydraulic sander is used on panels requiring a highly polished surface. The plywood panels are then inspected, graded, and placed in storage ready for shipment. All operations follow as closely as possible, one behind the other, to eliminate unnecessary handling. Inter-plant material handling, and the load of cars for shipment is done with Clark lift trucks.



Plywood being packaged for shipment.

Shipments other than carloads are packaged a few pieces to the bundle, with the edges protected with plywood trim and banded with steel bands.

Everything possible has been done to maintain a smooth flow of material throughout the plant, and to insure a quality product.

The End

COURSE FOR WOODWORKERS

A five-day short course in statistical quality control as applied to wood product manufacture will be conducted in the School of Forestry at North Carolina State College September 10-14. The course is designed primarily for executives, production managers, engineers, superintendents, quality control managers, chiefs of inspection for wood industries, and others with similar interests.

The principal objective is to explain the techniques of statistical quality control and to indicate how they may be applied to the various wood manufacturing and fabrication processes.

Further details on the course may be obtained by writing to Dr. James S. Bethel, School of Forestry, North Carolina State College, Raleigh.

Truth is not only stranger than fiction, it is much more interesting.—**William Randolph Hearst.**

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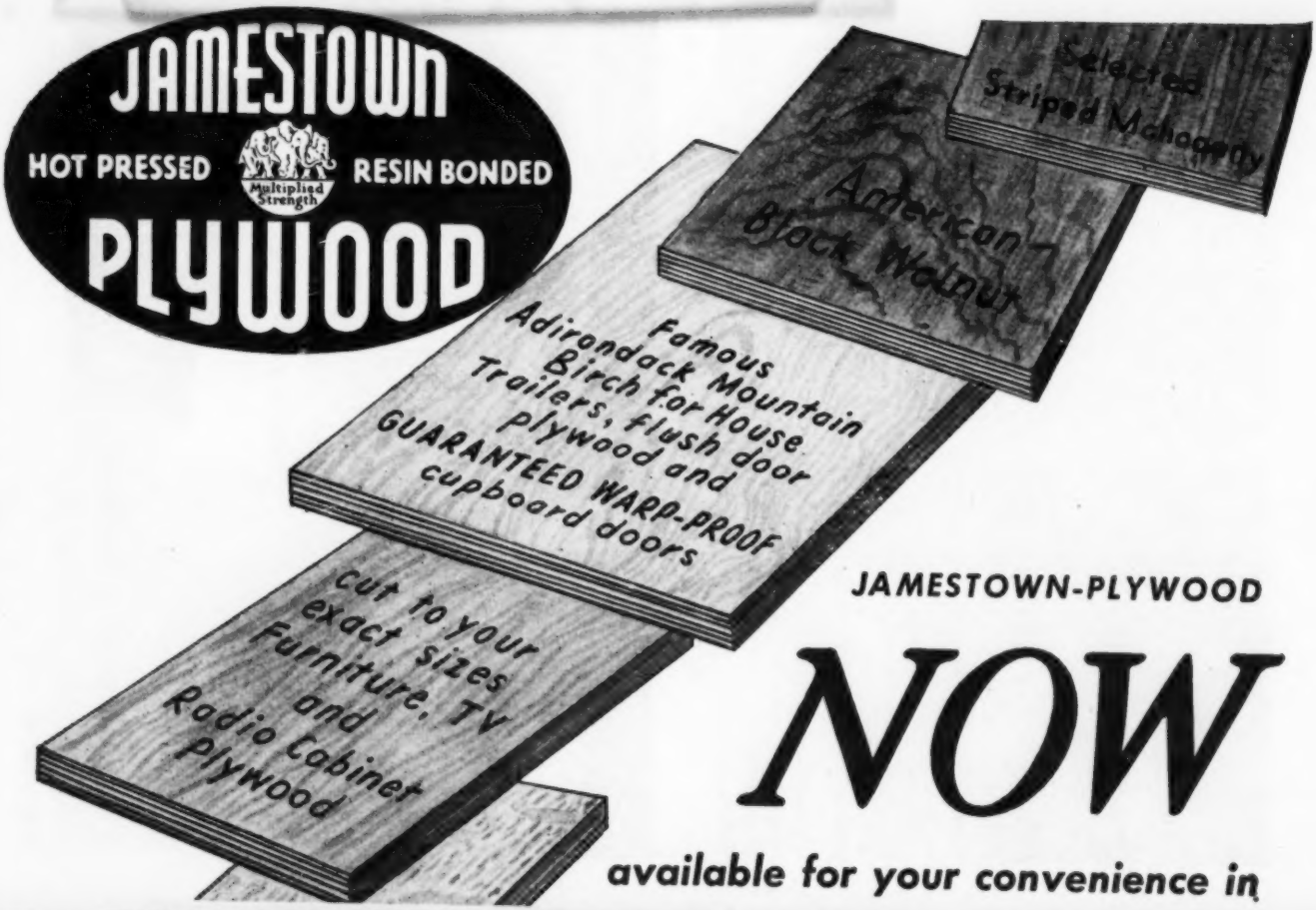
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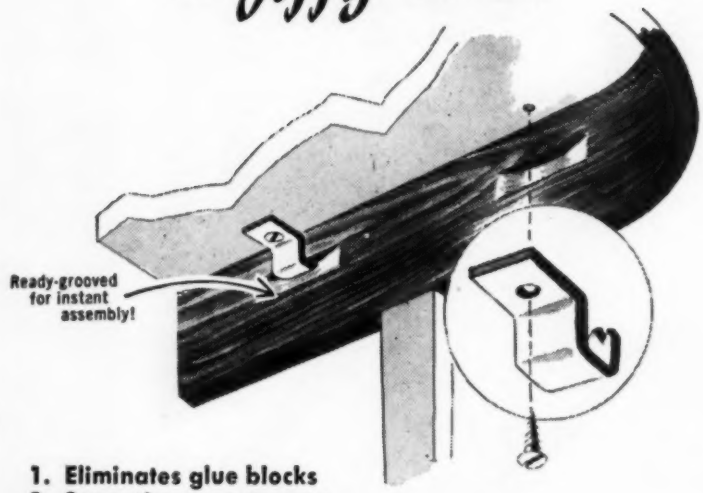

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VENEER and PLYWOOD

By Ned Bailey

Part 11

MAKING veneer into stock panels that could be put in warehouses and ordered out as required came into general practice the early part of the twentieth century. Prior to that time the use of plywood was restricted to specified custom-made constructions of special sizes and predetermined uses.

When the manufacture of stock panels began they were made in 3 by 6 foot sizes. Since then they have been increased in size to 4 by 8 feet. As the name implies, stock panel production permitted the stocking and storing of veneer and plywood panels and the design of construction to permit the maximum use of panels. Having stock panel sizes permitted the carrying of stock that would not only fit into standard construction but could be cut readily to fit any special requirement, all of which conserved time and money and greatly increased the use of veneer and plywood panels. Stock panels are now available in thin, medium and heavy thickness and a wide variety of faces and cores.

The moisture content of the component parts of plywood panels should be approximately 5% for face veneers so as to avoid checking under heat. Where lumber cores are used, to prevent warping, the moisture content should be not over 6%. Backs and crossbands may have a 6% to 8% moisture content. Adhesives of the urea resin type do not show the excess flow characteristics, at least under moderate moisture content, that are observable in the use of phenolic resin adhesives. A very worthwhile margin-of-safety for not too critical work is provided by urea-formaldehyde resins which give satisfactory results under a wide variety of conditions.

Generally speaking the "life" of urea-bonded plywood is less than that of plywood made with phenolic adhesives, this last depends however on the quantity and type of extender used, if any. Heat and hot water adversely affect plywoods made with straight urea bonds while the same are practically as good under cold water and fungus exposure as phenolics are. It has been the contention of some experts that there will

be a growing demand for resin adhesives made from melamine as they cure faster and are more water resistant than similar resins made from urea. It has been found that in durability and heat resistance melamine-formaldehyde resin adhesives are close phenolics, yet the bonding temperature and operational technique are closer to those used for urea-formaldehyde resins.

The simplest form of plywood panel is a three ply assembly, the two outer sheets are known as the face plies, the inner layer is known as the core. The grain direction in the core in three ply construction is at right angles to that of the face plies in standard construction. Incidentally practically all plywood is made of an odd number of plies. Five ply panels are made of five layers of wood in which the grain direction of the core and the faces are all parallel and the plies on each side of the core, between it and the faces, are bonded into the plywood panel with the grain at right angles to that of the core and faces. These sheets of veneer are known as cross-bands. Similar construction goes into panels composed of seven, nine or more plies. There is, of course, plywood made in which cores are of lumber instead of the conventional veneer core.

There are a few special types of plywood with an even number of plies, usually the designer of such plywood specifies the grain direction. Laminated wood which in a sense is plywood made of thicker wood plies is in reality multiply panels, beams and other structures in which the grain directions of all the component parts making up the assembly are parallel.

In the assembly of a panel the thickness of the adhesive spread required varies with the type of bonding agent and the method of bonding. The entire joint area should be uniformly covered by the adhesive, completely covered and devoid of air bubbles and foreign matter, using no more than is absolutely required to make a good joint. More glue than is necessary not only fails to improve the strength of the joint, but a thick glue line is more dangerous than glue lines that are too thin.

The amount of glue per 1000 square feet of glue line should be approximately as follows: when starch glues are used, set the spreader rolls to spread 75 pounds of liquid mix, for casein spreads of 60 to 75 pounds are recommended, and between 60 and 70 pounds for soybean. For urea-type resins the usual spread is from 30 to 40 pounds of straight or extended resin, and 25 to 35 pounds is sufficient for the resins of the phenolic type. Adhesive manufacturers and the manufacturers of components supply directions for spreading and these should be carefully followed to obtain the best results.

Timing is as important in this business as it is in most everything. The assembly time or assembly period is the elapsed time between the beginning of a spreading operation and the application of full pressure upon the glue lines of a plywood panel or batch of panels pressed simultaneously. Of major importance to the plywood manufacturer is the rapidity with which an adhesive begins to set up or cure. If, before full pressure is applied to the joint, an ap-

Have you who are interested in plywood and veneers also read "Gluing as a Factor Affecting Finishing" in the Finishing Section this month and "New Techniques for the Modern Furniture Manufacturer"? These two articles which appear elsewhere in the book should be interesting to those fabricating or using plywood and veneer.

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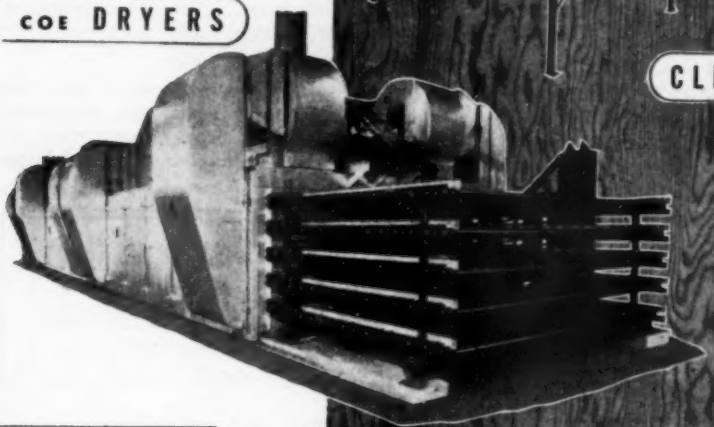

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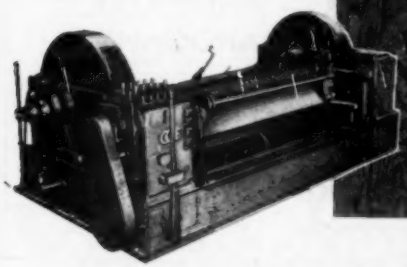

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preciable hardening of the glue on the surfaces of the wood takes place the flow of the bonding agent is retarded and thick glue films result, and in consequence adhesion is greatly reduced. In like manner, if the glue is too thin, and not allowed to thicken before pressure is applied then starved-joints result because of excessive squeeze-out and excessive absorption of the resin by the wood occurs.

If the best type of plywood is to be produced it is evident from the foregoing that careful control over assembly is mandatory. For the starch glues maximum assembly periods should never exceed 15 minutes and maximum for the casein adhesives from 10 to 20 minutes, preferably 10. With soybean glues in cold press 15 to 25 minutes and hot press 5 to 15 minutes. Depending on the synthetic-resin employed the assembly time varies from a few minutes to several days depending on the characteristics of the type used.

The plywood assemblies are ready for pressing after the veneers are spread in accordance with good shop practice. Pressing can be accomplished at room or higher temperatures according to the type of adhesive used. "Room" temperature pressing is "cold pressing" and at the higher temperatures, "hot pressing." For cold pressing starch, casein, animal, most soybean and some urea-type, resin adhesives are used. Hot pressing equipment is used in curing blood-albumin and a few soybean glues, a number of urea-type resins, and the phenolic-type resins. With the resorcinol-formaldehyde resins, although they will cure at room temperatures, a better bond is obtained if they are hot pressed.

Generally speaking there are two types of cold presses, the handscrew and the power press. The former are used in small shops or for special jobs

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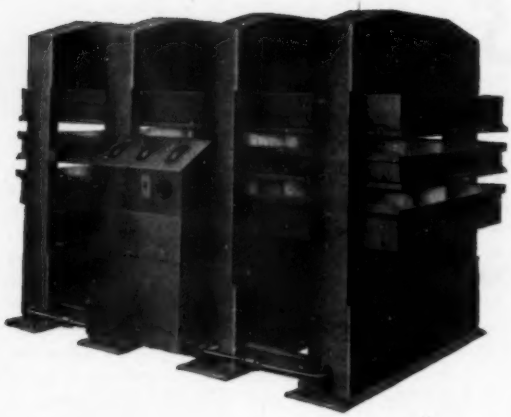

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in large shops when the production is limited or if the panels are so irregular in size that the power press is not practical. For pressing weight lead-shot in bags, sandbags or lead bars are used.

The most common of the power presses are the hydraulic press, the power-screw press, and the combination power-screw-hydraulic press. One or more hydraulically operated rams are employed to lift the lower platen, closing the press and applying the pressure in the hydraulic press. The power-screw presses are equipped with heavy, threaded strain rods upon which the upper platen travels to open or close the unit and to apply or release the pressure required. The combination power-screw hydraulic press makes use of the mechanical-screw system to open or close it and the hydraulic ram to apply the pressure. Pressure gauges are furnished with all types. Pressures range from 100 to 200 p.s.i. or more in cold press plywood manufacture based on the kind of wood and the type and consistency of the adhesive used.

When loading or charging a press the panels are stacked on a strong retaining board. However, each assembly is usually placed on a "caul-board," when thick panels are to be pressed. The caul-board is usually a well waxed, three-ply ⅜ inch plywood or a sheet of aluminum. Two to five or more assemblies are placed between cauls when thin panels are being made. Caul-boards act as a guard against injury to adjacent panel faces and are used to assure panel flatness while under pressure. A number of panels sufficient to fill the press to its capacity are placed on I-beams resting on the lower platen. A top retainer and second set of I-beams is placed on top of the stack. Retainer clamps are adjusted over the beam's flanges, as the press is closed, and they are taken up as pressure is applied. The clamps are given a final

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adjustment, once the full pressure is attained, then the press is opened and the bundle of panels is removed. Until the adhesive is thoroughly setup the retaining clamps are left on, depending on the bonding agent used. This period will vary from 8 to 24 or more hours. At the end of the needed time, the bundle is opened and the panels are inspected and sent to the finishing department.

The modern multiplaten hot press is usually hydraulically operated and the platens are internally heated. In hot pressing panels are laid-up between two thin cauls made of aluminum as a rule. One or two panels with their cauls are placed on each platen and as soon as the press is full or charged the platens are closed and full heat and pressure are turned on as quickly as possible. This type press will bond the assemblies into plywood panels in from 2 to 30 minutes regulated by thickness of stock, distance of glue line farthest from the heat source, the kind of adhesive and the curing temperature used. Usually the platen temperatures run from 300 to 350°F., and pressures range from 100 to 275 p.s.i. regulated by the wood specie used. With most modern hot pressing machines mechanical loaders are used to help press charging.

The hot panels are removed when the press is opened, stacked and allowed to cool and condition for several hours before going to the finishing room. The hot metal cauls are cooled completely before being used again to eliminate any possible chance of spoiling the panel with which it is subsequently used.

In the last few years radio-frequency heat has been made use of to cure synthetic-resin adhesives. The use of high-frequency (radio-frequency) for gluing plywood although having some disadvantages has many worthwhile

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advantages. For example, lower surface temperatures are possible yet shorter press time is needed. Conditioning panels after bonding is not necessary because the actual loss of moisture from the panel during bonding is slight, and no time is wasted between the bonding operation and the following one. Inasmuch as bulky stacks may be pressed with the same ease as those containing only two or three panels bonding time is greatly reduced. All of which adds up to easy-to-maintain volume production.

Mother: "Junior, don't use such bad words."

Junior: "But mother, Shakespeare used them."

Mother: "Well, don't play with him anymore."

KEY WORKERS FIND A PLACE IN THE SAFETY PROGRAM

By E. G. Holtzman

In this month's article a safety man shows the relationship between training and safety. Safety takes on meaning and importance when we can bring it into the individual worker's thinking. Mr. Holtzman is manager of the safety and medical division of the Wagner Electric Corp., St. Louis, Missouri. This paper was presented at the May meeting of the Greater Chicago Safety Council.

IT'S difficult to define a key worker in a safety program. Every worker is considered a key worker, however, at Wagner Electric Corporation we have come to place special emphasis on training non-supervisory personnel in every phase of accident prevention. There is a wide latitude for controversy as to how much authority should be given non-supervisory personnel in the scope of their operations. Our Company has come to the conclusion that every man who is a part of the program should have some work in carrying out that program.

It is with this in view that we inaugurated a policy several years ago of having the foremen appoint a departmental safety committeeman to serve for one year. Qualifications were that he be well-liked by his fellow employees, have a sincere interest in safety and had some job responsibility in his present position.

Duties of the committeeman were to make a complete inspection of the physical hazards of his department, spending one hour a week on this without loss of pay. Results of this inspection were noted on a form known as "Safety Committeeman Inspection Check List Report to Foreman." A copy of this weekly report is sent to the safety department. A safety committeeman can be removed only for good reasons and only with the approval of the general superintendent and safety director. This insures that after the safety committeeman has been appointed he will not be removed because he has exposed hazards or makes recommendations not agreed to by the foreman.

Before this program was instituted, top management questioned the wisdom of permitting a departmental appointment of a shop steward. It was contended that he might misuse this power and embarrass management. To those who are afraid of this trend, let me point out that grievances are often handled by an intelligent discussion of the foreman and departmental safety committeeman before they get to the written stage.

The foreman is requested to make this weekly tour of his department with the committeeman and very often hazards which are pointed out can be corrected on the spot, eliminating the need for reporting these in written form. But the written form acts in a two-fold

capacity, especially since the foreman is requested to sign the copy that goes to the safety department. This in effect puts the foreman on notice that he knows that the hazards are present and also dates the notice that he has received of this hazard. It is clearly evident that with a good working arrangement between the departmental safety committeeman and the foreman, the committeeman can be of tremendous aid to the foremen. Without exception our foremen have accepted this program as a tremendous aid not in relieving them of their safety duty, but augmenting their "safety eyes."

The recommendations of the safety committeemen total about 1000 each year. Those that are not written total about 10 times that amount. Of the written recommendations 85% are approved, about 12% remain pending for a period of time and only 3% are rejected. In each case a thorough explanation is given to the departmental safety committeeman and generally an understanding reached as to the reason for rejection. We believe that if these steps are not carried through the entire program will fail.

Training the Committeeman

Here is how we train our departmental safety committeeman. After the committeemen are appointed a general safety meeting is held. A clear policy is outlined to the men and women of this committee, with an appeal to their sense of responsibility for their fellow workers' safety. In this hour session they are told that they are the safety engineers for their departments. A specially prepared film on making a safety inspection is shown. At this meeting we discourage the reporting of inconsequential hazard potentials. This first hour of training is the kick-off for the year and vitally important.

These meetings are continued throughout the year at least once each month when the entire group is assembled for instruction and film showing. No open floor discussions are permitted as we feel this would easily get out of hand.

In addition to the committeemen we have two safety inspectors whose duty it is to visit the departmental committeemen. We have done this as frequently as once a day. Close, personal contact is extremely important. It is by personal contact that people maintain interest and where there is a difference between foreman and committeeman frequently the safety inspector can resolve these differences on the spot before the difference of opinion is crystallized.

Safety interest is built up in still another way—departmental meetings for discussion on subjects covered by safetygraphs and at which time the departmental committeeman and foreman can be singled out and commended for their work on safety. These meetings have been very successful.

The committeeman is told to always go through the correct chanels with his complaints. For instance, if he has a disagreement on some hazard with his foreman, he is advised to see the divisional superintendent. If the divisional superintendent refuses the recommendation, his next recourse is to the safety department. In practically every instance an agreement is reached at this stage. Not once in three years has any departmental safety committeeman appealed to the union for support in carrying out a recommendation which in itself is adequate proof that the program is working and working well.

At the end of the year the departmental safety committeemen are given a banquet at which time all the foremen, divisional superintendents, our president and several vice presidents usually attend. An outside speaker prominent in the field of safety delivers

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the address. Departments working without a disabling injury are awarded prizes at this time. Last year's gifts totaled approximately $5000.

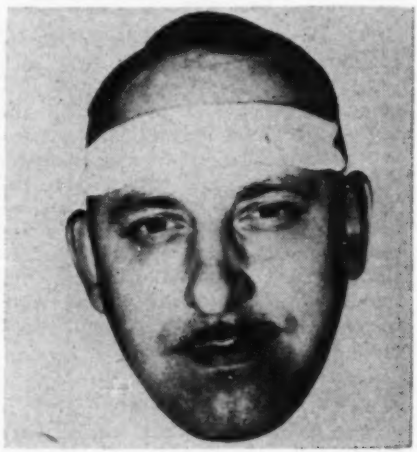
Summary

We believe that we have the answer to a problem which has plagued many a plant. In our opinion this is the best program for any plant and as proof of this statement we have had an accident frequency rate of 1.86.

It has always been said that given the correct information and all the facts, the American public is capable of making a fair and intelligent decision on any subject. Giving them all the facts contemplates an adequate training program. Those of you who may not be taking advantage of the wonderful job your training department can do for you are missing a sure bet in accomplishing your objective which is the prevention of injuries. The training department and safety department should go hand in hand. Remember, you are limited to what you can do by yourself, but unlimited as to what you can do with the help of others. Training is the key word in accident prevention.

COOLER HEADS FOR WORKERS

This sweatband keeps eyes cool and comfortable. Keeps spectacles and goggles clear, increases efficiency and safety, states the General Scientific Equipment Co., 2700 W. Huntington St., Philadelphia, Pa.



These expanded cotton sweatbands are produced by a special process from cotton-backed gauze expanded to about eight times its normal thickness. This makes all of the fibers "extra-thirsty" to absorb perspiration faster.

Super-soft and feather-light, there are no metal parts to rust or chafe. These sweatbands should help give your workers real comfort on the job. The band is strong enough to be rinsed repeatedly, yet low enough in price to be replaced at a nominal cost.

FIRE PREVENTION

Unquestionably fire hazards are greater in the woodworking industry

than they generally are in other manufacturing operations. Scarcely a week passes without our hearing of great losses to some wood product manufacturer through fire. Some of these accidents can be traced to unsafe actions. Others to a lack of safety precautions such as a sprinkler system, fire fighting equipment, etc.

Perhaps many folks feel that it can't happen to them. Seemingly it not only can, but does. Check over your fire prevention preparations and while doing so, check these points too.

Exits in case of fire are very important. Every plant should have an adequate number. An exit should be available within a reasonable distance of the working area. There ought to be at least two exits from every room and floor. These exits ought to be far enough apart so that fire in one section will not automatically close off both exits. Paths to these exits should be kept clear of debris, storage, etc.

A good alarm system and an orderly plan for leaving the buildings are necessities, of course. If your buildings have not been constructed to be fire-resistant, there is special reason for taking note of fire prevention planning at your plant.

PROTECTIVE CREAMS

A complete line of barrier creams and liquids for skin protection and cleaning is announced by the Safety Division of The Boyer-Campbell Company, 6540 St. Antoine Street, Detroit 2, Michigan, and is known to the trade as "Skin-Cote." It consists of six different types of creams and four different liquids to take care of every individual need. The creams come packed in 8 oz., 12 oz., and 16 oz. jars, 12 or 24 jars to a carton and 25 pound pails; the liquids in pints, gallons and 50 gallon drums.

Complete information is available in a sixteen-page catalog.

Sharpens and bevels each tooth as it comes along . . . fastest circular saw filer available

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Keeps bevels true, points balanced and teeth uniform and saw in perfect cutting circle.

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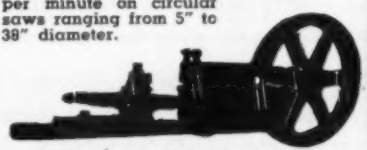
AC 38 Setting Machine Automatically sets teeth at a speed of 150 to 200 per minute on circular saws ranging from 5" to 38" diameter.



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Like all Saranac Machines, they manufacture, drive and clinch their own staples in one stroke. Thus you get the superior holding power of tightly clinched, heavy-duty staples—yet staples are formed of standard, low-cost wire from coils available on the open market.

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YOUNG & BERTKE DUST CONTROL SYSTEM saves 56 Sweep-Up hours in time DAILY by removing Sawdust and Shavings from Shapers, Saws, Chuckers and Molders PLUS the reduction in absenteeism caused by colds and respiratory infection. Tons of sawdust, shavings, etc., are whisked outside every week, leaving the plant free of dust.
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PROGRESS WITH HARDBOARD

More and more toy manufacturers, furniture and auto makers are turning to hardboards to help them produce their products. Auto makers put hardboard into partitions and shelves over spare tire racks. Toy men make doll houses of it. Furniture men use the board for drawer bottoms. Magazine display racks are often made of it. Builders put hardboard into walls, door panels and even gigantic grain bins. The surface of possible uses for hardboard has still scarcely been scratched.

Besides being very versatile, hardboard is cheaper than other materials which have formerly been used in these specific applications. These factors are causing at least seven hardboard plants—at a cost close to $15 million—to set up business in the Pacific northwest. Together they'll turn out about 885,000 square feet daily. This should step up the national output by about 40%

THIS revolutionary air cylinder is a complete power unit in itself. Four-way directional valve, with an operating lever adjustable to work from any angle in any plane, and separate speed controls for advance and retract strokes, are integral with the cylinder itself. This compact "controlled-air-power" unit requires only one air connection which can be flexible hose. Available in 1¼", 1¾", 2½", 3⅜" and 4½" bores. Any stroke length.

Known as the Bellows Air Motor, this modern version of air cylinder power makes air safer, easier and simpler to use. Helps in a hundred ways to get more production at lower cost.

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The Bellows Co.

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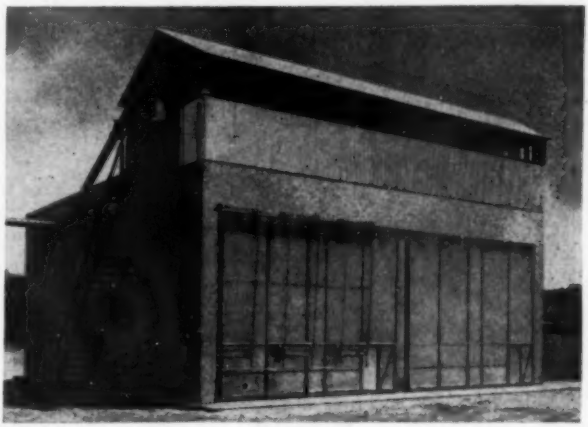
Included among these new plants are: Cascades Plywood Corp., Lebanon, Ore.; Anacortes Veneer, Inc., Anacortes, Wash.; Long Bell Lumber Co., Longview, Wash.; Coos Bay Lumber Co., Coos Bay, Ore.; and Oregon Lumber Co., Dee, Ore.; Oregon Fibre Products, Inc., Pilot Rock, Ore.; Washington Hardboard Co., Raymond, Wash. The Weyerhaeuser Timber Co. and the M and M Woodworking Co. may begin making hardboard soon.

Four years ago, it is claimed, not one piece of hardboard was being made west of the Mississippi. A few companies are already producing hardboard in this area. The Forest Products Co., Forest Grove, Ore. and the Chapman Manufacturing Co., Corvallis, Ore. are already producing a combined 125,000 square feet daily.

In northern California the Masonite Corp., Chicago, opened a plant last December. It has a capacity of about



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IMRIE'S recognition in this field stems from a reputation for doing just that type of job . . . not from a high overall cost of kiln equipment or construction. Imrie's efficient kilns are a matter of record in the industry. This is a result of many factors, all of which add up to better design and more efficient operation.

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- LESS STEAM due to the use of copper coils in all unit heaters and the added efficiency of IMRIE design.
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- BETTER AUTOMATIC CONTROL with the exclusive ElectroniK Multiple Thermocouple Control System.

You get all these advantages at the cost of ordinary dry kilns and in addition IMRIE has the only system that is especially adaptable to the remodeling of Cross-pile Kilns without changing the original kiln layout.

IF YOU ARE CONSIDERING A NEW KILN OR THE REMODELING OF YOUR PRESENT EQUIPMENT, IT WILL PAY YOU TO CHECK WITH IMRIE FIRST.

IMRIE DRY KILN COMPANY

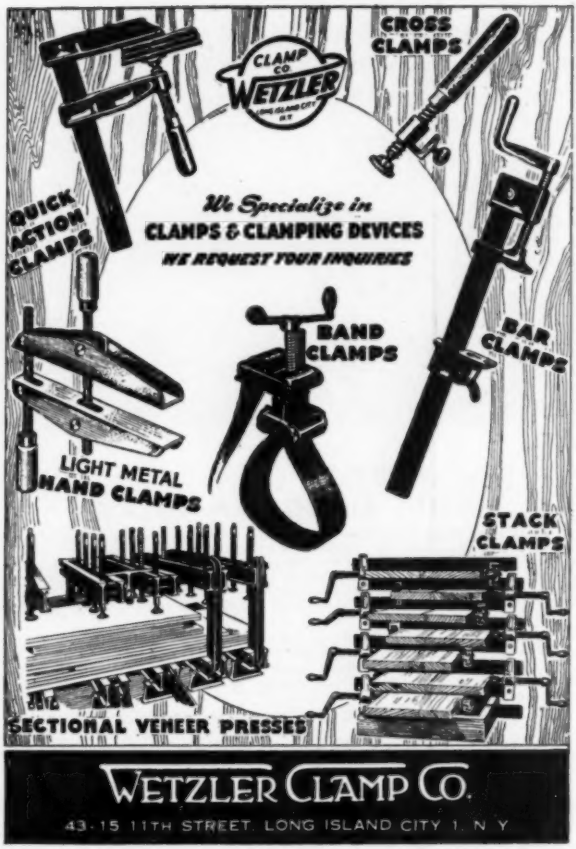
PEARL & OTTAWA GRAND RAPIDS, MICHIGAN

400,000 square feet daily, but we are told that it has not yet reached this full production. Most of this output is going to Stan Steel Div. of Great Lakes Steel Corp. for lining military Quonset huts.

Some East-of-the-Mississippi manufacturers are: U. S. Gypsum Co., Greenville, Miss.; Superior Wood Products, Duluth, Minn.; Rock Island Mill Work Co., Rock Island, Ill. These firms produce a combined 250,000 square feet a day.

Almost all current hardboard expansion is taking place in the northwest, we are told. Although the south is also heavily-wooded, that part of the country, in proportion, is already using more of its waste wood than is the northwest.

One of the big reasons for making hardboard, it is claimed, is the money factor. Lumber companies needed to get more money out of their wood waste. Waste wood sold to pulp mills for paper making brings only about a third of what the same wood turned into hard-



board will return per ton. Another lure to those considering manufacturing hardboard, is the comparatively low cost of running a hardboard plant. Most of the work is done by machinery and the entire manufacturing operation may take less than an hour. Hand labor is most used in putting sheets of hardboard through the saws that cut them into the right size panels.

The Plywood Research Foundation states that only about 30 workers are needed to turn out 75,000 square feet a day. Hardboard provides lumber mills with an opportunity of using plywood which may not be of facing quality. One company is reported to be using two layers of hardboard around a "filling" of lower grade plywood. This product is being used by builders for concrete forms.

However, even though there seem to be many uses for hardboard, there is also some resistance. It is difficult to convince prospects that it is really wood and not cardboard. It is also hard to persuade potential buyers of the material's durability. When these obstacles are removed, there will be additional progress for the hardboard industry.

RADIO-FREQUENCY GENERATOR FOR DIELECTRIC HEATING

A new 5-kw radio-frequency generator for dielectrically heating a wide range of non-metallic materials in wood and other industries, is available from Westinghouse Electric Corporation, Box 2099, Pittsburgh 30, Pa.

The generator is readily adaptable to batch or continuous production methods, delivering rated power at a 100 percent duty cycle, measured by approved NEMA standards.

This unit can be supplied in either of two styles: With a 6.8/13.6-megacycle dual-frequency oscillator for low- and medium-power-density requirements—such as large area panels to be heated for gluing; or with a 27.1-megacycle oscillator for high-power-density loads —such as plastic preforms.

Equipment operating controls are held to a minimum, with all control adjustments made from the front panel. This, plus a full complement of protective devices, puts operation of this equipment on a semi-skilled basis.

The enclosure is designed to minimize radio-frequency radiation, and the complete generator is certified to comply with F.C.C. regulations.

HOUSES WITH MOVABLE INTERIOR WALLS

A Washington D. C. builder plans a 250-unit housing development in which the houses will be built around central utility cores. The bathroom, the kitchen and space for heating equipment are to be located in one rectangular unit in the center of the floor plan. The interior partitions are subsequently placed to provide room arrangement desired by the family occupying the house. Since these walls do not support the house, they can also be rearranged at any time.

The builder believes his plan will not only provide a house that will always meet the needs of the particular family in occupancy, but it will also permit substantial savings in construction.

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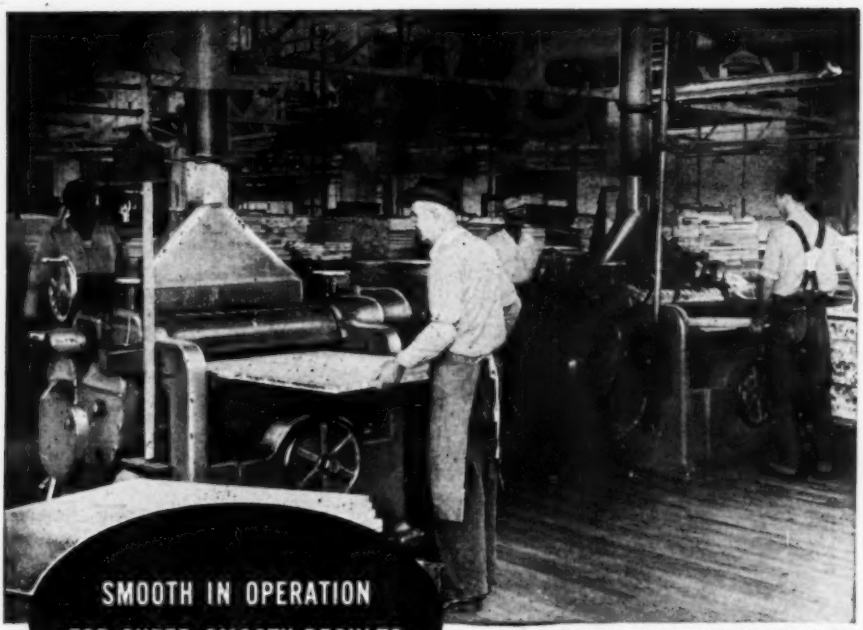

SMOOTH IN OPERATION FOR SUPER-SMOOTH RESULTS

GREENLEE NO. 110 PLANERS IN OPERATION AT WHITE FURNITURE COMPANY, MEBANE, N. C.

. . . Greenlee No. 110 Six-Roll Single Planer

The minute you run a piece of stock through a GREENLEE No. 110, you'll see what we mean when we talk about "smoothness". Finely finished panels can be planed so smoothly that they require little or no sanding.

Yet the No. 110 is a production machine for all types of planing. Feed speeds for rough cuts as well as for finely finished work are available. The entire operation is performed with such ease and speed . . . the finished work comes out with such fine finish and accuracy . . . you'll be able to picture immediately the extra production this GREENLEE equipment can bring to your plant.

Friction, wear, and power consumption are reduced to an absolute minimum by means of ball and roller bearings, and oil-tight housings for the gears, which keep out dust and dirt. Bearings are lubricated by high-pressure grease gun, and the enclosed gears run in oil and lubricate themselves.

In all, the GREENLEE No. 110 Planer brings to all kinds of work . . . whether box boards or finely finished panels . . . unusual production speed, ease of operation, and accurate, smooth results. Write today for details. Greenlee Bros. & Co., 1868 Twentieth Ave., Rockford, Illinois.

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GREENLEE WOODWORKING MACHINERY: MORTISERS • BORERS • SAWS • TENONERS • PLANERS • SHAPERS • MORTISING and BORING TOOLS

WOOD Industry Notes

AMERICAN WOOD WINDOW INSTITUTE APPOINTS RACEY

Erle Racey has been selected to temporarily serve as secretary-manager of the American Wood Window Institute, effective immediately. Any business pertaining to the institute will be handled through his office, 3012 Maple Ave., Dallas, Texas.

Edwin L. Racey has been appointed assistant secretary of the Institute. His address is the same as above.

F.P.R.S. DATES COMING

September 19, 20, 21—Midwest section to meet at Oshkosh, Wisconsin discussing developments, equipment and techniques in plywood and veneer, millwork and furniture production. Executive board of the Society will convene in Milwaukee, September 17 and 18.

September 27 and 28—Inland empire will hold its annual demonstration meeting at Sandpoint, Idaho.

October 5 and 6—Florida-Georgia-Alabama section meets at the Daniel Ashley Hotel at Valdosta, Ga. Theme—wood mobilization. Principal speaker, Admiral Joseph F. Jelley, C. E. C., U. S. N., Chief of Bureau of Yards and Docks.

October (date to be announced) Deep South Section to hold its annual meeting at Shreveport, La. Host will be the A. J. Hodges Industries, and tours through its expansive operations are planned.

November 1 and 2—Northeast Section to meet at the Massachusetts Institute of Technology, Boston, Mass.

BLACK COMPANY OFFICERS

The Black Brothers Company, whose president, John E. Black, passed away last February, recently elected new officers. Robert S. Black assumes the offices of president and treasurer. James S. Carroll has been elected vice president and secretary.

SNYDER EXPANDS

Snyder Chemical Corporation of Bethel, Connecticut, announces increased facilities for production of Synco 128 series resins. The present critical shortages of resorcinol have greatly handicapped manufacturers of high-frequency, hot and cold-press plywood, prefabricated housing, freight cars, truck and station wagon bodies, boats, and other specialized wood-assembly products where waterproof glues meeting government specifications are required.

DR. LOCKE AT MADISON

Dr. Edward G. Locke, chief of the Forest Utilization Service in the Pacific Northwest Forest Range and Range Experiment Station, is being transferred from Portland, Ore., to the U.S. Forest Products Laboratory at Madison, Wis., it was announced today by Dr. J. A. Hall, Director of the Laboratory. Locke will be chief of the division of

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FACTORY TRUCKS

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Standard sizes 24" x 48"—30" x 48"—30" x 60". Special sizes and styles to order—capacities up to 7500 lbs.

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derived products, which conducts research in wood chemistry.

The transfer of Dr. Locke to the Madison Laboratory will free Dr. A. J. Stamm, acting in charge of the derived products division for a number of years, from administrative duties. Dr. Stamm, colloid chemist well known here and abroad for his publications and papers on wood chemistry, will be able to devote full-time effort to research.

TREE FARMS TENTH BIRTHDAY

All timber trails of the Pacific Northwest led on Tree Farm Day, June 23rd, to Montesano, Washington, home town of the grandaddy of all the nation's 3,109 certified tree farms. This is Clemons Tree Farm, which sweeps over the mountains south of the Chehalis River to the shores of historic Grays Harbor and the Pacific, with nearly 155,000 acres owned by the Weyerhaeuser Timber Company and another 17,000 acres under the same management plan.

Governor Douglas McKay of Oregon took time out from problems of state to come up to Montesano to share honors of Tree Farm Day with Washington's Governor Arthur B. Langlie. They appeared with Stanley F. Horn, southern lumber editor and historian, Col. W. B. Greeley, and Clemons Tree Farm Forester Robert M. Ramstad, on the NBC Farm and Home Hour. This was a live program, originating in Montesano High School, and piped out directly to five million listeners from the center of an area that boasts nine large tree farms.

Another honored guest was Mrs. C. H. Clemons, widow of the pioneer forest enterpriser who turned much of the big wilderness timber of the present tree farm land into jobs and business. A bronze plaque commemorating the tenth anniversary of the tree farm movement was unveiled. Presented by American Forest Products Industries, Inc., the plaque is now permanently placed on the Grays Harbor County courthouse in Montesano.

Appointments

W. H. Geib has been made superintendent of the Glidden Company plant at Reading, Pa. Mr. Geib has been production manager of the Reading plant for the last five years. **Robert Kempf** will be his assistant.

Herbert B. Link

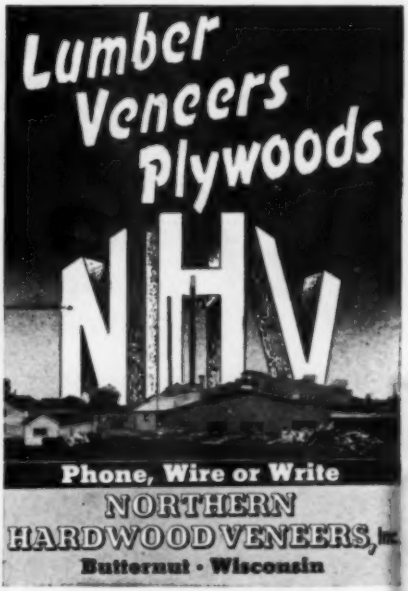
L. F. R. Bellows, Jr.

Herbert B. Link, executive vice-president since 1939 of the Bellows Company, Akron, Ohio, has been named president of the company. Mr. Link succeeds L. F. R. Bellows who died this spring. **L. F. R. Bellows, Jr.**, Detroit, Mich., was named vice president and **Byron D. Kuth**, Cleveland, Ohio, secretary-treasurer. **W. C. Richards, Jr.**, has been named executive assistant to the president of the Bellows Company, Akron, Ohio. Mr. Richards has been with the Company since 1947.

W. C. Richards, Jr.

E. W. Ristau

Ohlen-Bishop Manufacturing Company of Columbus, Ohio, has chosen **E. W. Ristau** as its general manager. Mr. Ristau has spent almost his entire career in the tool field and is an authority on industrial distributor selling.



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• VERSATILITY
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COMBINATION HEAD
a master tool for master craftsmen—
for a wide range of woodworking jobs!
. . . cuts costly set-up time, boosts production! Available with milled-to-pattern bits that hold their pattern permanently for door and sash (either standard or special), as well as for matching, shiplap and mouldings of most any shape!
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TO SOLVE ALL NAILING PROBLEMS

But THOUSANDS OF PROBLEMS PREVIOUSLY CONSIDERED IMPOSSIBLE HAVE BEEN SOLVED BY . . . . . .

DOIG AUTOMATIC NAILERS

DOIG NO. 45-20-16

NEW FEATURES

A. Wheel on left allows operator to adjust back gage from operating position.

B. Solenoid trip permits operator to trip machine at any position desired.

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STANDARD DOIG FEATURES

1. Anti-friction bearings
2. Three separate motorized drives
3. Nail feeder to handle nails from 1 to 3 inches without additional parts required.
4. Nail feeders to give 12 separate nailing combinations.

WRITE TODAY . . . we invite your requests for full details

WILLIAM S. DOIG Inc.

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Sawdust and The Woodworking Industry

YEARS ago we published feature articles on the various uses of sawdust—everything from bar-room floors to packing ice in ice houses. Little did we realize then how great a change would take place in the use and demand for this so-called wood waste, or should we say wood residue material.

The need for research to develop more and better uses of sawdust and shavings has been supplied to a large extent by chemists and engineers of the Forest Products Laboratory at Madison, Wisconsin and several large manufacturers of adhesives and a few far sighted independent chemical engineers and wood by-product specialists. The use of wood by-products in the production of components for various plastic materials has brought to light many innate properties that have made what was once considered "waste" a really valuable material.

At the recent Forest Products Research Society's Industry Show in Philadelphia there were several displays of products made with sawdust and/or shavings as a component part. One of these displays that justifiedly attached much favorable attention was that of the Bakelite Company, a division of Union Carbide and Carbon Corp., of New York City.

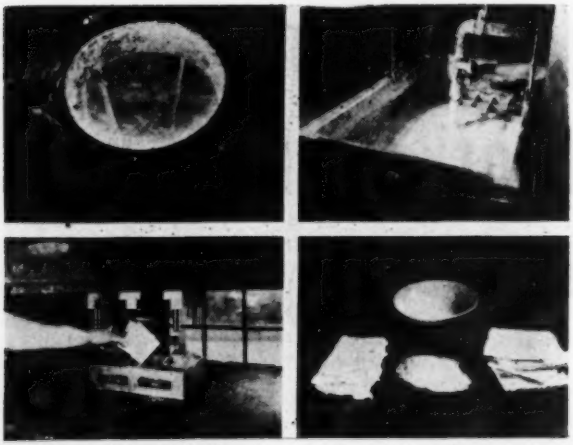
Discussing their display with them we were surprised and interested by the extent to which they had gone and will go with any manufacturer interested in the use of their various products. Among the products made and the manufacturers who have already found a profitable use of sawdust and other wood waste materials and Bakelite

products, the following seemed outstanding.

In The Laundry

A sturdy, attractive laundry hamper lid molded of sawdust and phenolic resins shows the commercial feasibility of making the fullest possible use of wood by-products. The lid is economical to produce, structurally strong, and resistant to impact, abrasion, moisture, flame and most chemicals.

A quantity of sawdust mixed with a smaller amount of specially developed Bakelite phenolic resins is compressed to about one-seventh of its former bulk by Insulation Manufacturing Company, Brooklyn, N. Y., to make the 21¼ by 11¾ by ⅝ inch hamper lid.

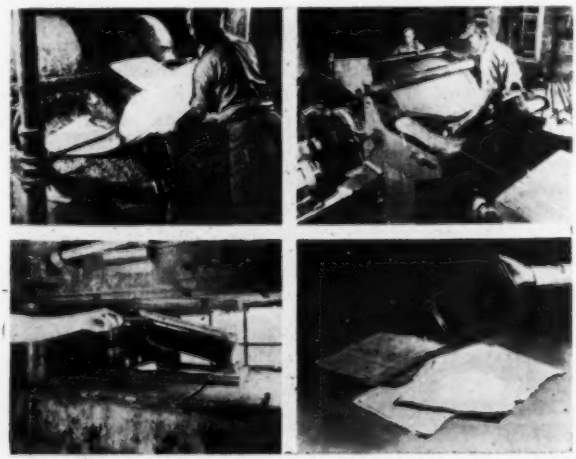


The mixture is formed in a Meehanite mold under only about 700 pounds per square inch pressure. Fine wood flour dusted over the top before molding gives the lid a smooth surface which, when painted, matches the baked-enamel finish of the heavy gauge aluminum laundry hamper produced by Detecto Scales, Inc.

Dining Room Equipment

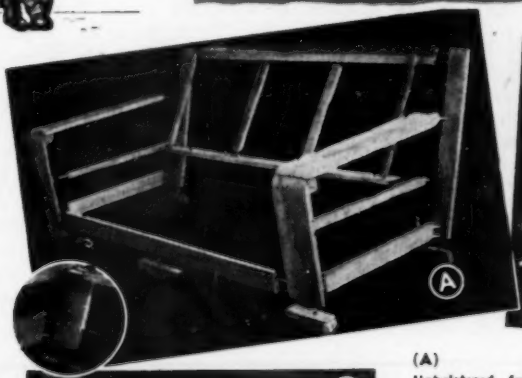
Stronger and more moisture-resistant plastic salad bowls are molded from new, water-insoluble phenolic resins and paper pulp to preserve the wood fiber's strength and appearance. The salad bowls are an example of many plastic products prepared by the pulp preform process.

Salad bowl pulp preforms were photographed at various stages of the process at the plant of the Resin Pulp Fibre Co., Inc., R. D. Bridgeport, Pa. A pulp mixer mixes white sulphite pulp paper and water containing insoluble phenolic resin which enters by the pipe at the left. The mixture is then fed into



BORING BILL SEZ

"FOR UPHOLSTERED FURNITURE, ROOT DOWEL BORERS CAN'T BE BEAT"



(A) SOFA

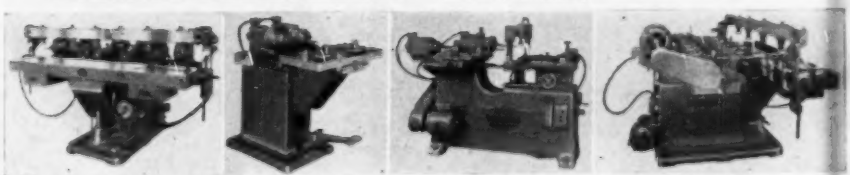
Upholstered furniture such as this sofa frame can be handled entirely on the Style D200 or in combination with a Vertical Multiple Spindle Machine such as the Style CH or Style C311.

(B) CHAIR

Upholstered rocker illustrates a combination of face, edge and end boring. This rocker can be bored entirely on the Style D200 or in combination with a vertical machine.

(C) SAVES MONEY TOO!

Accurate dowel boring saves time and effort in your assembly department. Pieces go together with a minimum of hand fitting.



Style D200 Style D360 Style D150 Style K250(H)

A few of our boring machines. If you don't see what you need, ask for it.

B. M. ROOT CO. YORK, PA.

a vacuum box where a large part of the water is sucked off leaving squares of pulp fiber whose interlocked fibers have trapped the insoluble resin particles suspended in that water. Slight pressure squeezes out more of the water and the pulp preforms are dried in warm air at slightly better than room temperatures. A mold charge of four pulp preform squares is placed in the mold and emerges as a glossy, high strength salad bowl.

Preform molding is shown as it is done by the Bolta Company, Lawrence, Mass. This molding requires a temperature of 300°F. and pressure between four and five thousand pounds per square inch. Lighter colors in varied hues and simulated wood graining texture can be given to products molded from these pulp preforms.

Bulk factors of the raw materials going into the mold are reduced by the pulp preform process, making them easier to handle and transport.

In The Refrigerator

Resistance to water and considerable strength is claimed for such high impact molded plastic products such as the new food trays produced from unbleached Kraft pulp paper and the new Bakelite phenolic resins. The illustrations used here show the steps in the pulp preform process and were photographed at the plant of the Resin Pulp Fibre Co., Inc., Bridgeport, Pa. A paper beater mixes water-insoluble phenolic resin, paper pulp and water to a thin, vacuum filter, 30 to 35 percent of the water is drawn off and the water-insoluble resins are trapped in a screen formed by the long wood fibers of the pulp mash. Continuous sheets of the wet pulp coming off the rotary filter are cut into preforms about the size of the object to be molded, and then dried at slightly higher than room temperatures.

SLASH TOOL COSTS—SPEED PRODUCTION

With VELEPEC Carbide - Tipped Router Bits, Grooving Saws, Shaper Knives, Four Wing Shaper Cutters, etc. for every conceivable shape. Stay sharp 10 to 30 times longer than regular steel tools. They stay sharper, cut cleaner and faster with smoother finishes. Effect tremendous savings in machine "reset" time and sanding operations.

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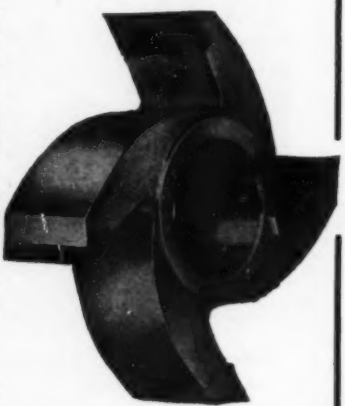

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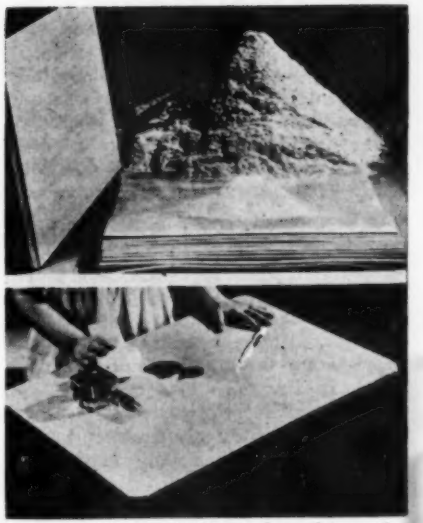
Preform molding as done by the Bolta Company, Lawrence, Mass., is preformed at temperature of 300°F. and pressure between four and five thousand pounds per square inch. The molding operation completely transforms the flaky, fibrous preform into a glossy, strong tray. Among other products the pulp preform process has been adapted to the manufacture of such diverse plastic products as shell plugs for army shell cases; cheap, transportable printing plate matrices, strong fairleaders for army tent ropes; and high-impact strength surfaces for television tables. Keyes Fibre Co., Waterville, Maine, is another manufacturer who also prepares and molds pulp preforms.



Desk and Table Tops

Durable, attractive and easily cleaned desk and table tops molded of sawdust with special Bakelite phenolic resins and resin-impregnated paper show the commercial feasibility of making the fullest possible use of wood waste. These tops are economical to produce,

HAVING SAW TROUBLES?

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JAEGER CARBIDE TIPPED SAWS

- **PRECISION BUILT**
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Here at Jaeger are specialists in saw manufacture . . . repair and reworking. Whether you require new saws . . . or if you have saws in need of repair or reworking, tell us about it. We can handle any size . . . any make . . . and give prompt efficient service everywhere.

Pictured at the right is a typical scene in the Jaeger plant showing careful saw inspection during process of manufacture. You can rely on Jaeger . . . call or write today.

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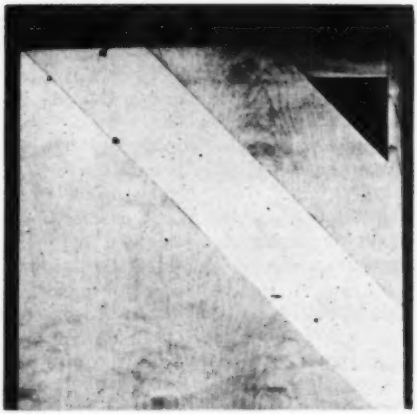
structurally strong and resistant to impact, abrasion, moisture, flame and most chemicals. Sawdust mixed with a formula prescribed amount of specially developed Bakelite phenolic resins and laid between ten sheets of impregnated paper is compressed to about one-seventh of its former bulk to make the 18 by 24 by ¾-inch desk or table top.

It is molded under only about 700 pounds per square inch pressure by Insulation Manufacturing Company, Brooklyn, N. Y. The resin-impregnated surface and crossbanding sheets add strength, dimensional stability and toughness to the top used on desks made by J. L. Hammett Co., Boston, Mass. The abrasion-resistant surface sheet with a beautifully grain effect is easy to wipe clean with a damp cloth.

Cross-Bands and Masking Sheets

Strong, long wearing plywood furniture and woodwork that show none of the knots and cracks found in lower



grade lumber cores, all made with paper impregnated with phenolic and urea resins. These resin-treated papers, the manufacturer tells us, will permit the use of wood containing splits, cracks or other defects in veneers or plywood without sacrificing strength or good appearance.

MORE SPEED MORE SUPPORT

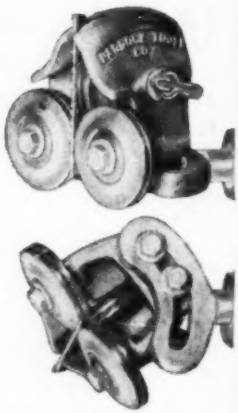
MORE WORK

BAND-SAW GUIDE NOW SETS

AT AN ANGLE UP TO 45°

With this new PADDOCK BALL-BEARING GUIDE MODEL 20, blade can be held at an angle—permitting a 36 inch machine to cut material 22 inches thick at an angle up to 45° to any length. The guides are easily adjusted to width, thickness, and blade angle—the ball-bearing wheels reduce blade breakage and hold the working portion of the blade so that more and better work can be turned out.

NOTE: Lower Unit is turned to show angular adjustment. Write for price and details on this NEW GUIDE today.



PADDOCK TOOL COMPANY

Guide Makers Since 1920

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Paddock BALL-BEARING BAND SAW GUIDES

Paper sheets of varying thickness are treated with phenolic or urea resins, then laminated or glued to low quality wood cores to provide smooth, uniform surfaces that are dimensionally stable under wet or dry conditions and can take paint without a primer coat. Manufacturers who are now making these crossbands and masking sheets include: Consolidated Water Power and Paper Company, Wisconsin Rapids, Wis.; U.S. Plywood Corp., 55 West 44 St., New York, N. Y.; Kimberley-Clark Corp., 250 Park Ave., New York, N. Y.; and Pioneer Plastics Co., 28 Goodhue St., Salem, Mass.

The paper crossband showing as a white diagonal in the cut-away picture is placed between two wood veneers to hide the dips and inner imperfections of the honeycomb door and also to provide more rigid construction.

Crossbands are made of heavy paper treated with phenolic or urea formaldehyde resins and are cured and dried to form stiff, water-resistant sheets.

Glued to both sides of rough lumber core with as little as five pounds of dry resin per thousand square feet of glue line, these crossbands furnish strong wood panels, masking the knots or cracks of the lumber core.

Stiff masking sheet, which cannot be deformed under pressure, is made of paper .012 to .017 inch thick containing 20 to 25 percent synthetic resin, which has been similarly cured and dried. Masking sheets that are laminated on the surface of veneer or plywood upgrade the wood quality and at the same time make an excellent base for paint or other decorative finish.

Bakelite laboratories have developed special phenolic and urea resins for

For MORE HOLES between Sharpenings

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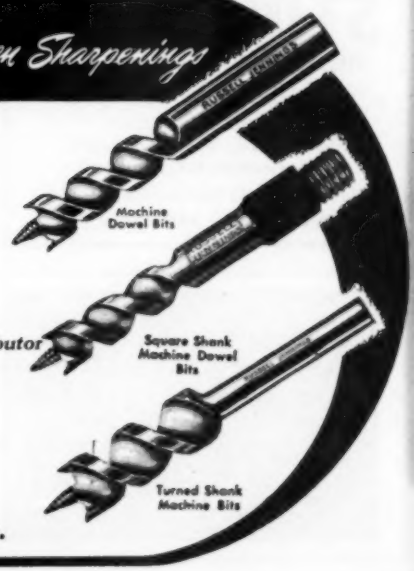
ON THE BITS YOU USE

● The special tool steel, made to Russell Jennings' own analysis, gives these bits LONGER EDGE LIFE. For you that means more holes between sharpenings.



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THE TOOL BOX OF THE WORLD

Stanley Tools, 119 Elm St., New Britain Conn.

practically any variety of wood residue molding and masking sheet or crossband impregnation. These enable molders to make products such as furniture parts, structural components, brush handles and many other items of superior quality from wood that might otherwise be wasted.

The End.

HARDWOOD STRIP FLOORING

The Federal Housing Administration has approved a relatively new and simple method for economical installation of strip hardwood flooring over concrete slabs in home construction financed with FHA guaranteed mortgages, the National Oak Flooring Manufacturers' Association reports.

The method, with minor variations, has been gaining popularity in recent years, particularly in the south and southwest where builders pioneered it. Heretofore, however, its use in homes with FHA guaranteed mortgages required special approval of local FHA authorities.

Permitting economies through elimination of wood subflooring, the system involves installation of tongued and grooved strip hardwood flooring to sleepers imbedded in mastic on top the concrete slab.

Regulations covering various details of the method have been incorporated in the FHA Minimum Property Requirements. They specify that:

The sleepers be laid flat side down in a staggered pattern 12 inches on centers and at right angles to the direction of the finish flooring. The ends of the sleepers should be lapped at least 3 inches if 2¼-inch flooring is to be used and at least 4 inches if 3¼-inch flooring is to be employed.

Sleepers must be at least 2x4-inches in width and thickness and not less than 18 inches nor more than 30 inches long. They must have a moisture content of no more than 19 per cent.

The new regulations also approve the practice of embedding the sleepers directly in the concrete before it has hardened, or securing them to the concrete by means of metal clips. These are alternative methods employed by some builders. Imbedding the sleepers in mastic, however, not only is equally satisfactory, but is speedier and more economical, according to William J. DuBrucq, chief inspector of the National Oak Flooring Manufacturers' Association.

STOP DUST

DUSTKOPS — **20 Models**
UNIT TYPE — 300 to 3600 cfm
LOW COST — ¼ hp to 5 hp

AVAILABLE FROM STOCK

For: Grinders, buffers, polishers, woodworking, lint . . . All Dusts.

Send for Cat. 605a; describe problem.

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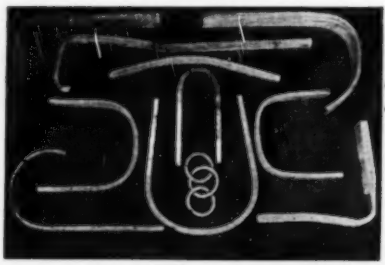


BENT WOOD

If it Bends We'll Bend It!

Standard and Custom Bends Our Specialty

Sorensen & Peters, Inc.

Box 145-H — Westerly, R.I.

When either of the alternative methods is employed, the sleepers need not be 2x4's, but must not be smaller than 2x2. Sleepers imbedded in concrete must be pressure treated with a wood preservative.

Arrangement of sleepers in a staggered pattern with the ends lapped produces a sound, double nailing surface throughout a large area of a room and thus permits plenty of nailing, DuBrucq said. The spaces between the sleepers at the same time lend a desirable degree of resiliency to the hardwood floor, making it easy on the feet, he pointed out. While the regulations do not mention 1½-inch wide flooring, DuBrucq said, it is assumed that the same end lapping of sleepers be employed with that size flooring as with the 2¼-inch width.

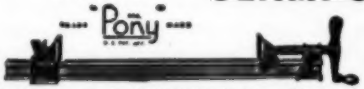
In most areas, danger of moisture seepage from beneath the floor is eliminated by application of a moisture barrier either on top the slab or underneath it before it is poured. DuBrucq explained. This barrier usually consists of two layers of 15 lb. felt and hot asphalt or hot pitch. In very arid regions a waterproof admixture in the concrete provides sufficient protection against moisture seepage. Slab specifications suited to the needs of climate and construction sites are determined by local FHA officials.

The FHA action, DuBrucq said, is expected to result in considerably expanded use of strip hardwood flooring in concrete slab homes, particularly those in the low-cost range where the economies of sleeper-in-mastic techniques are important factors. Builders of such FHA-mortgage insured homes will find they can offer real hardwood floors at little more than the cost of substitute flooring, DuBrucq declared.

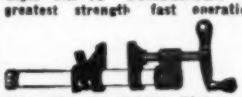
National Hardwood Lumber Association convenes for the 54th annual convention, September 24-27, at Chicago.

"Jorgensen" CLAMPS

"Pony"



Style No. 70 "JORGENSEN" I-bar Clamps for greatest strength, fast operation, and economy.



Style No. 50 PONY Fixtures make ideal bar clamps on black pipe — any length.

"JORGENSEN" "C" clamps are built to take hard service, at low cost.

Genuine "JORGENSEN" Handscrews — hard maple jaws, steel spindles. You can depend on them.

ADJUSTABLE CLAMP COMPANY
"The Clamp Folks"
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Carbide

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Springdale, Conn.

KILN TEMPERATURE ▶ Effect on Yellow Poplar Core Stock

By Edward C. Peck
Technologist, Forest Products Laboratory

IT is commonly believed that the high temperatures used in kiln-drying lumber have an adverse effect on its strength. Air-dried wood is presumed to be stronger than kiln-dried wood at the same moisture content. Numerous experiments have been performed at the Forest Products Laboratory in an attempt to determine the effect of dry-kiln temperatures on strength. The results of these experiements were used in preparing dry-kiln schedules for aircraft lumber. During a recent study[1] of quality control with respect to the moisture content of lumber going into production at a furniture factory, an opportunity was presented to gather more data on comparative toughness values. In this study yellow poplar core stock that had been first air-dried, was then kiln-dried by means of a standard kiln schedule and also by high-temperature kiln schedules. Specimens for toughness tests were taken from the yellow poplar lumber both before and after kiln-drying.

The experimental material was cut from 4/4 yellow poplar boards that were obtained from two sources of supply; southeastern Virginia, and the Savannah river delta in Georgia. The lumber from the first source was used in the first and second kiln-drying experiments (runs No. 1 and No. 2), and lumber from the second source was used in the third (run No. 3). The temperature and relative-humidity schedules used in the kiln-drying experiments are given in table 1.

Forty-two boards were selected as samples for strength tests as the lumber was being piled on the kiln trucks for each kiln charge. Seven sample boards were placed in each of the six kiln truckloads making up a complete charge. One sample board was placed in the 12th, 18th, 24th, 30th, 36th, and 42nd course on each kiln truckload. An effort was made to select wide straight-grained boards with a fair representation of both heartwood and sapwood. Before kiln-drying, a 3-foot section was sawed from the end of each sample board and the remainder was placed in the truckload. The end of the board from which the section was cut was marked. After kiln-drying, another 3-foot section was cut from the same end of each board. The 3-foot sections were shipped to the Forest Products Laboratory, where they were carefully conditioned until they reached a moisture content of about 12 percent.

After reaching a moisture content of about 12 percent, a 1-foot piece was cut and dressed on both sides to a thickness of 3/4 inch. The 1-foot pieces were cut from the two 1-foot sections that came from a single board, in such a way that they would have been adjacent to each other in the original

[1]The material for this experiment was collected by Raymond C. Rietz, Chief, Division of Timber Physics, Forest Products Laboratory, Madison, Wis.

Table 1.—**Kiln-drying schedules used on 4/4 air-dried yellow poplar core stock**

Time	Moisture content of samples	Temperature		Relative humidity	Remarks
		Dry bulb	Wet bulb		
Hours	**Percent**	**° F.**	**° F.**	**Percent**	
			Run No. 1		
0	[1]45.3	150	137	70	Kiln conditions held for 3 hours
20	[2]36.7	140	132	80	Kiln conditions held for 17 hours
8	31.6	145	135	75	
16	21.7	150	137	70	
7	19.0	150	137	70	
17	14.1	150	137	70	
10	10.0	150	137	70	
21	6.6	160	135	50	
19	3.6	170	120	24	
2		170	140	45	
19	5.9	170	154	67	Equalizing treatment
139 total					Conditioning treatment
			Run No. 2		
0	[1]23.8	160			
21½	12.8	160			
7		160	100	13	
17	5.5	200	110	[3]0	
8½	4.1	200	110	[3]0	
15½	2.7	200	110	[3]0	
8¼	3.3				Equalizing treatment
16¾	4.0	186	152	43	Equalizing treatment
24	5.5	183	168	70	Conditioning treatment
118½ total					
			Run No. 3		
0	[1]15.4	200	126	312	
33	3.9	200	126	312	
15	3.0	180	110	11	
27	4.8	180	152	50	Equalizing treatment
21		180	167	73	Conditioning treatment
8	6.5	180	145	41	
104 total					

[1]Initial moisture content, average of two kiln samples.
[2]Moisture content after 20 hours of drying.
[3]Approximate value.

board. The dressed pieces were tested for straightness of grain, on one face and on both edges, by means of a swiveled scribe. Five specimens, 3/4 inch wide and 10 inches long, were laid out on each piece in line with the grain direction. Specimens laid out on the pairs of pieces cut from the same board were located so as to be in corresponding positions. Pieces with spiral or diagonal grain sufficient to prevent the lining-up of the specimens with the grain, were discarded. The pieces remaining numbered 37 pairs from each of the three kiln runs. After sawing out the 3/4-inch-square specimens, they were given an additional conditioning treatment to assure a moisture content of about 12 percent. After this treatment, they are dressed to 5/8-inch squares 10 inches long for toughness tests. The number of specimens was

Table 2.—**Average toughness values for air-dried and for kiln-dried yellow poplar boards**

Run numbers	Toughness		
	Air-dried	Kiln-dried	Difference, air-dried minus kiln-dried
	Inch-pounds	**Inch-pounds**	**Inch-pounds**
1 (regular)	136.5459	131.3459	5.2000
2 (accelerated)	135.0189	121.9000	13.1189
3 (accelerated)	114.2108	108.5540	5.6568

1,100, divided equally between the air-dried and the kiln-dried boards and among the three kiln runs.

The toughness tests were made on the Forest Products Laboratory toughness machine over a span of 8 inches, at an initial pendulum angle of 45°, and at a weight position of 4. The toughness values for the five specimens cut from a single piece were averaged to obtain a mean value for the piece. The results of the toughness tests are given in table 2.

The values in the table show that toughness was reduced by kiln-drying. The reduction in toughness of the lumber dried by the standard schedule is not significant. The two accelerated or high-temperature schedules did cause significant decreases in toughness. The toughness value for the air-dried lumber from Georgia (run No. 3) was lower than the values of the air-dried lumber from Virginia (runs No. 1 and No. 2). In addition, the toughness value for the air-dried lumber from Georgia

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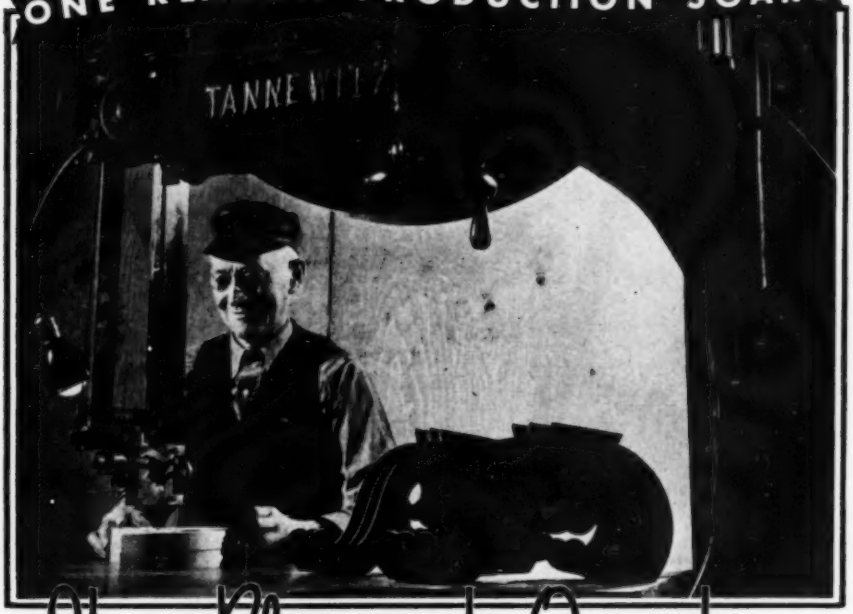
was lower than the values for the kiln-dried lumber from Virginia. While the accelerated schedules (runs 2 and 3) did result in significant decreases in toughness, the amounts of the decrease are not large on a percentage basis. When converted to a percentage basis, the values are about 10 and 5 for runs No. 2 and No. 3, respectively.

While the toughness of the yellow poplar boards was decreased by kiln-drying, it is highly improbable that the amount of decrease would be of any commercial importance. It is therefore concluded that 4/4 yellow poplar lumber to be used for furniture panel cores can be dried by means of an accelerated schedule at temperatures as high as 200° F. The slight decrease in toughness that results should not change its utility value.

ONE REASON PRODUCTION SOARS



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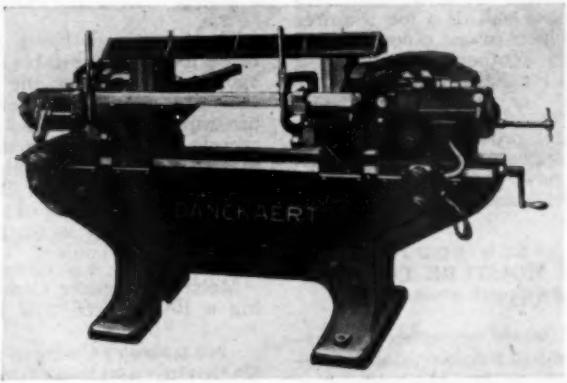

Supreme Woodworking Machinery Co., 50-52 Howard Street, New York, now introduces the Danckaert grooving and tenoning machine. It is well suited for mass production of all straight pieces of wood, within certain size limits, which must be cross-cut and machined at both ends with precision, such as rails, frames, drawer fronts, and sides, legs, floor blocks and similar parts. The machine consists basically of two sliding heads, each with a horizontal and vertical spindle, and a two-piece adjustable table, all set on a cast-iron frame.

The horizontal spindles are adjustable vertically for trenching and usually carry saws. The vertical spindles carry saws, circular cutters or cutter-blocks, and are adjustable both horizontally and vertically. All the spindles are made of high tensile steel, accurately machined and fitted with SKF double row ball bearings.

The table, in two sections, is joined by a cross piece and forms a rigid unit of any length, from 8" to 3'6" to 5', according to the size of the machine. Ball bearings provide a smooth, easy sliding action.

One of the important features of the Danckaert machine lies in the clamps which automatically grip the wood as soon as the table is moved forward towards the tools and are automatically released as soon as the table is returned

to its original position, the manufacturer states.

NEW FASTENER

Burr-lock is a new metal fastener designed to join wood and other materials and offered by Metal Industries, Burr-Lock Div., Youngstown, O. The burr is a steel ring having sharp pronged edges. Thus burr-lock may be pressed or driven into materials which are to be joined. The burr-lock may be used with or without nails or glue and the manufacturer says that according to bend tests burr-lock will strengthen nailed joints more than 50%.

The design of the ring (burr) permits the burr-lock to enter both pieces of wood equidistance—even if soft fir is joined with hard oak. If a job requires setting of the burr in one piece of wood before joining another piece to it, a special tool is furnished for the job.

Burr-lock is made for production jobs or custom-built products to save time, to improve appearance, to strengthen joints. This new product is made in three sizes: ½, 1 and 1½ inches.

DETERMINE MOISTURE CONTENT OF WOOD WASTE

With wood waste becoming increasingly important to industry, determination of moisture content is a vital factor in the successful conversion of the waste material into such items as plywood cores, pressed furniture and other fabricated wood products, according to woodworking authorities. Maintenance of correct moisture content in the manufacture of articles from wood waste can make the difference between a poor or an outstanding product.

Moisture Register Company of 1510 W. Chestnut, Alhambra, California, manufacturers of electronic instruments for testing of moisture content in wood, leather, paper and textiles, have developed a moisture testing instrument, Model PD 1, specifically designed for testing wood flour, wood shavings,

wood chips, sawdust and similar by-products.

The instrument has a penetration of three inches, is portable and simple to operate, according to the manufacturer. Moisture content is determined by pressure of the gun electrode against a sample of the material, preferably placed in a small container such as a wide-necked glass jar. The instrument operates with a press of the thumb and one reading only is required to determine moisture content.

Moisture Register Company is offering a 10-day free trial for the PD 1.

SANDING AID

The Carborundum Company, Niagara Falls, New York, announces a new waterproof sanding paper, known as Red-I-Cut waterproof paper, for the woodworking industry.

A new type of backing provides Red-I-Cut paper with properties that result in better finishes, faster cutting rates and better mileage in nearly all lacquer finishing operations, the manufacturer claims.

There are no wild edges on the paper to produce scratching of the surface. The new paper need not be soaked in preparation for use but is ready to use right off the pack.

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5. Sealed-for-life ball bearings.
6. High grade tool steel cutters for heavy duty work.

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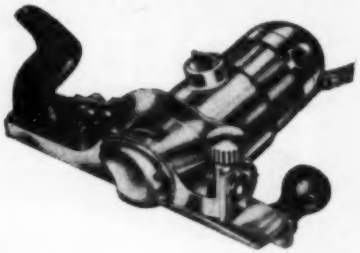
STANLEY PRESENTS PLANE

Stanley Electric Tools, New Britain, Conn., announces the new J38 plane. This new power plane cuts up to $1\frac{1}{16}$" wide and designed to give perfect chip disposal. A Stanley feature combines control of air flow from the motor ventilating system and chip flow from the cutter itself providing a disposal of chips to the rear and downward away from the cutter and operator. This eliminates the possibility of chips becoming lodged under the plane shoe and marring the finished surface. Fence can be tilted for angle planing up to 45°



inboard and 15° outboard. It is particularly useful for planing bevels on the bottom of screens, windows, etc. Easy adjustment can be made for locating cuts correctly in relation to rear shoe, also for depth of cut up to 3/32". Motor is ½ h.p., 20,000 r.p.m. Polished aluminum finish. When mounted and inverted, the J38 Plane becomes a handy jointer.

LOW PRESSURE CYLINDERS

These cylinders which operate by air, oil or water are available from the Hanna Engineering Works, 1765 Elston Ave., Chicago. Among the unusual features claimed for Hanna LP cylinders are: a cork floater ring which facilitates cushion alignment with the head and insures a seal during cushioning; spring-backed chevron rod packings which are self-adjusting for consistently correct compression; and the flange design

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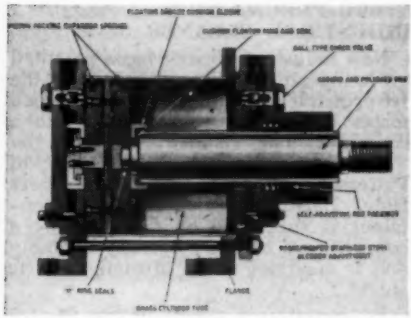

which permits removal of the front head without disturbing the mounting.

Hanna LP cylinders are designed for operation up to 110 psi, and, with minor modifications, for higher pressures depending on the cylinder diameter and operating medium (air, oil or water). Standard models permit the selection of a cylinder to meet a variety of mountings.

NEW WALLBOARD

Ply-Veneer is a new wallboard developed by Elmendorf Research, Inc., of Chicago to overcome some of the problems associated with the use of plywood in the weather. It is made of a single ply of thick veneer that has been stretched or distended and after distending is faced on both sides with heavy Kraft paper bonded to the veneer with a weatherproof adhesive. The surface exposed to the weather is painted, or it is faced with resin-impregnated paper in the factory.

The veneer core of Ply-Veneer is generally 3/16-inch thick. It is distended by a process of slitting in which the wood is wedged apart into narrow elements without removing fibers, thereby increasing its width about 8 to 10%, and providing room within the panel for expansion so that the panel remains flat in the weather.

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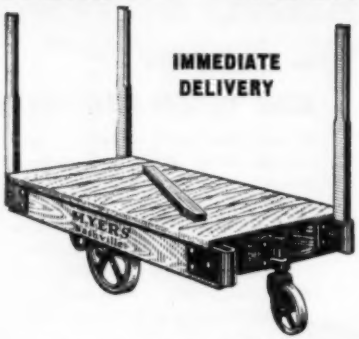

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New industrial cleaner has a patented vibrating air valve that creates by the jet principle an agitating suction, which forces dirt and metal particles into a container. The cleaner is offered by Vibro-Pneumatic Cleaner Co., Div. of Patterson Products, 518 Maccabees Bldg., Detroit 2, Mich. The dirt container is supported on the back by a conventional belt and harness assembly and is encircled in an attractive fabric shield.

By operating a second of two finger-tip control valves, a vibrating external air jet is created. This jet is directed forward through an orifice in the cleaner head to dislodge dirt and metal particles from inaccesible places to spots where they can be picked up by instantly changing to a suction action.

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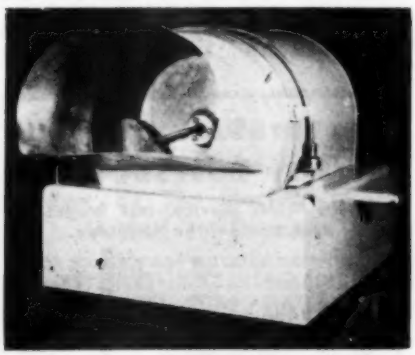
This cleaner is efficient because the agitating suction action dislodges and collects dirt and metal particles that steady suction will not pick up. It is safe since no electrical components, which might create fire hazards, are used. It operates from any 80 p.s.i. and up compressed air source.

IMPSCO INDUSTRIAL HUMIDIFIER

This new humidifier requires no ducts, no pumps, no compressed air and no steam lines. Each unit is a complete system in itself and only requires a water feed line, we are told. No return water line is required. The vapor is emitted in an extremely fine mist-like form. The humidifier works on the principle of atomization through centrifugal force, states the manufacturer, Industrial Materials Purchasers of 401 Broadway, New York 13, N. Y.



A few of the physical details are as follows: vaporization capacity, one gallon per hour; weight, about 5 lbs.; dimensions, 12" wide, 14" high, 22" long;

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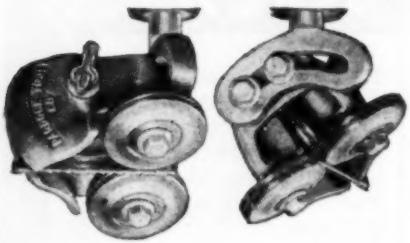
water supply is used from ordinary drinking water mains at regular pressure; vapor is emitted in just one direction so that the units can be mounted on the walls, corners or supporting posts.

BAND SAW GUIDE

Paddock Tool Company, 1418 Walnut Street, Kansas City, Missouri, announces a new model saw guide as an addition to their line of ball-bearing band-saw guides. A feature of this new guide is that it holds the blade at any angle.

The manufacturer claims these advantages: the three ball-bearing wheels in each guide reduces the danger of saw blade breakage; they hold the working portion of the blade so that more work can be performed; and the blade can be held at any angle. When 36 inch band-saw machines are equipped with the new No. 20 set of guides and the blade held at an angle of 45°, material can be cut to any length. The guides are easily adjusted to the width, thickness and the desired angle of the blade.



VP: "Do you know what they do with boys that tell lies?"

Office boy: "Yes, sir, when they get old enough, the company sends them out as salesmen."

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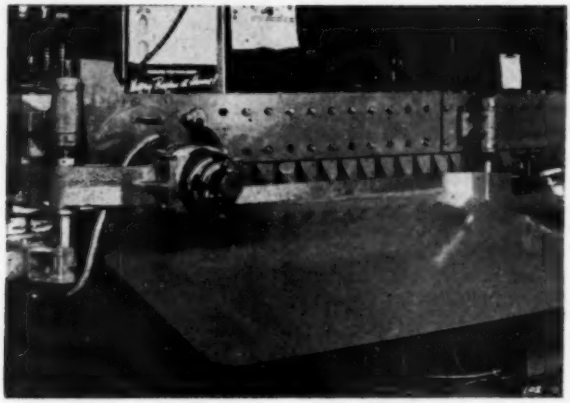

Bark edging attachments for installation on Linderman automatic wood fabricating machines in the field are now available from Muskegon Machine Company, Newburgh, New York. The attachment is individually motorized and permits feeding lumber into the Linderman machine without first removing the bark. The attachment trims off the bark or any defects in the untrimmed lumber with the least possible amount of edge waste.

Extensions for Linderman machines to permit installation of the bark edg-

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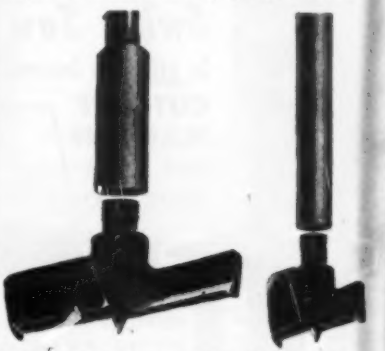

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PRICE & RUTZEBECK

BOX 30 HAYWARD, CALIF.

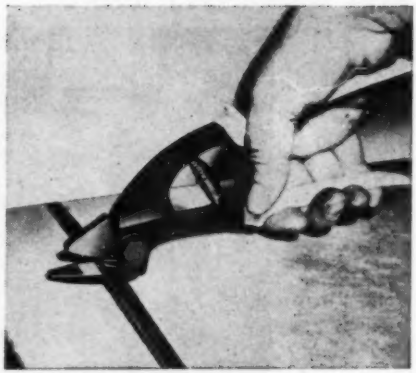
ing attachment without interfering with machine capacity are also available and may be installed by the user in his own plant.

With the bark edging attachment, old-style Linderman machines can be converted to perform all operations from trimming of lumber to complete double-tapered, dove-tailed assembled panels.

NEW STRAP CUTTING TOOL

Acme Steel Company, 2840 Archer Ave., Chicago, has just introduced the E14A0 strap cutter, a lightweight tool designed to cut flat steel strapping up to ¾"x.035".

Among features of the simple construction is a band guide which prevents straps from wedging sidewise between the blades. A flat lower blade permits easy insertion beneath tensioned straps on bales, bundles and cartons.



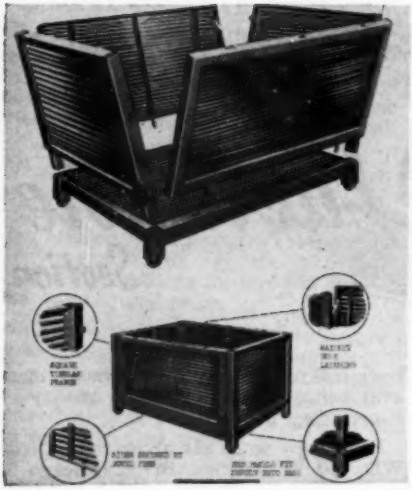
Frame and blade are constructed from forged steel for rugged performance. Narrow span handles are curved to fit the grip of the operator. Measuring 9½ inches long, the tool weighs one pound.

MATERIALS HANDLING SYSTEM

The Jervis B. Webb Company, Conveyor Engineers and Manufacturers, of 8933 Alpine Ave., Detroit 4, Mich., announces their development, manufacture and sales set-up of a new materials handling system—the Hazen knock-down materials handling box. The Jervis B. Webb Company believes this to be the most amazing basic materials handling innovation in years. With its patented nesting features and built-in safety, the Hazen knock-down materials handling box combines the stacking and strength features of rigid boxes with the consolidation features of other collapsible boxes. The Hazen boxes have been in use by larger manufacturers for over three years.

The Hazen Knock-Down Box saves time and labor because its patented stacking features permit the safe and rapid transportation and stacking of loaded or empty boxes in multiple numbers, thus saving labor in handling materials—also, more labor and time is saved through the manv applications permitted through the removable side features.

The Hazen box is built in 2 standard



dimension—the "A" box is 48" long with 27.5 cu. ft. capacity. The "B" box is 54" long with 30 cu. ft. capacity. All boxes are constructed of square steel tubular frames, corrugated steel panels, and further, the sides can not spring because of their being secured by dowel pins which fit into holes provided in the base frame. The disassembly features of the Hazen boxes permit their use as pallets, open side or three-side boxes, and can be doubled in depth by the simple addition (due to the patented nesting features) of two extra sides and two ends. The Hazen boxes are accessible to 8-way pickup by fork trucks. Hazen boxes can be also procured with wire mesh sides and designed for canvas sides.

Fight Waste Plan, developed and promoted by Henry Disston & Sons, Inc., Philadelphia is operating successfully. There is a serious steel scrap situation throughout the country. Any manufacturer with out-moded surfacers, planers, etc. ought to help get behind this slogan: "Scrap turned in, is steel turned out."

You may depend on

Sta-Warm

ELECTRIC

GLUE POTS

½ to 11 qt. capacities. Variable thermostat, removable inner liner, brush wiper, 110-v. A-C.

Sta-Warm ELECTRIC CO.

'05 N. CHESTNUT ST. • RAVENNA, OHIO

Nutting's 60th Year

Fig. A

A NUTTING VETERAN

A husky, long lived truck at a low price. Semi-steel running gear — 13½" diam. main wheels that roll easily—6½" casters that really swivel. Northern hardwood, rigid frame, platform 15" above floor. Platform sizes 27 x 48, 27 x 54, 30 x 60.

Write for Bulletin 47-W

Nutting Truck & Caster Co.

1124 Division Street Faribault, Minnesota

WD New Literature Section..

YATES-AMERICAN BULLETIN

The scenes behind the machines are shown in a bulletin prepared to illustrate the manufacturing story of the products of Yates-American Machine Company. You may see for yourself the complete facilities this firm, founded in 1883, uses to manufacture their products for the woodworking, heat transfer and general refrigeration industries. Of special interest is the group of machines illustrated for the production of flooring. Other machines are listed and illustrated showing the complete line manufactured by Yates-American.

For a copy write to the above Company, Dept. WD, Beloit, Wisconsin.

FOREMAN TRAINING

"What Foreman Training Means to Production and Profits," is the title of a booklet issued by Lester B. Knight & Associates, Inc. The report is designed to answer the questions business and business-men have been asking on foreman training. These questions include: Why consider foreman training? How does foreman training pay for itself? What can foreman training accomplish today? Why should you consider engineered training? What distinguishes Knight engineered training and how is Knight training service rendered?

Today's indecisive economy with its material and labor shortages, changing production requirements, Government regulations and growing complexity of business places greater emphasis than ever before on improving the quality of supervisory personnel.

For a copy write the above firm, Dept. WD, 600 W. Jackson Blvd., Chicago 6.

AETNA PLYWOOD BUYING GUIDE

Aetna Plywood and Veneer Company has issued a single-ply veneer buying guide and price list. A complete warehouse stock listing of over 25 different species of single-ply veneer, and the explanation of policies on mill shipments of veneer and special curved and molded plywood services are included. In a special section of the list, Aetna presents a number of fine figured fancy face veneers for custom-made paneled rooms, furniture and store fixtures.

For your copy write the above Company, Dept. WD, American Furniture Mart, 666 N. Lake Shore Drive, Chicago, Ill.

XL GRINDING WHEEL BOND

The vitrified silicon carbide grinding wheel bond, XL, is described in a 4-page folder issued by the Chicago Wheel & Mfg. Co. The brochure gives details on applications and advantages of using XL bonded wheels for tungsten carbide tool grinding, plus specifications of the straight and cup wheel sizes for rough and finish grinding.

For a copy write the above Company, Dept. WD, 1101 W. Monroe St., Chicago.

WOOD PRESERVATIVE SPECS

An up-to-date compilation of specifications for the use of pentachlorophenol wood preservative issued by state, federal and armed forces agencies is available from Monsanto Chemical Company, St. Louis 4, Missouri.

The 17-page bulletin contains 60 specifications and an abstract of each, including several by utilities, associations and regional groups. They range from specifications for the chemical itself to formulations for treating structural lumber and poles.

One of the first to manufacture pentachlorophenol on a commercial scale, Monsanto is offering the bulletin as a guide to engineers, architects, contractors and others who specify or use penta-treated wood.

CONTROLS FOR SYNCHRONOUS MOTORS

A bulletin featuring polarized field frequency controls, standard interrupting capacity type, for synchronous motors has been published by the Electric Machinery Mfg. Co.

Illustrations and descriptions in detail are given of all the standard types of these controls for full voltage, reduced-voltage and part-winding starting. It is also replete with helpful, catalog-type data including ratings, weights, dimension drawings, wiring diagrams, layout drawings and specifications for each type of control that is covered.

For a copy write the above Company, Dept. WD, Minneapolis, Minn.

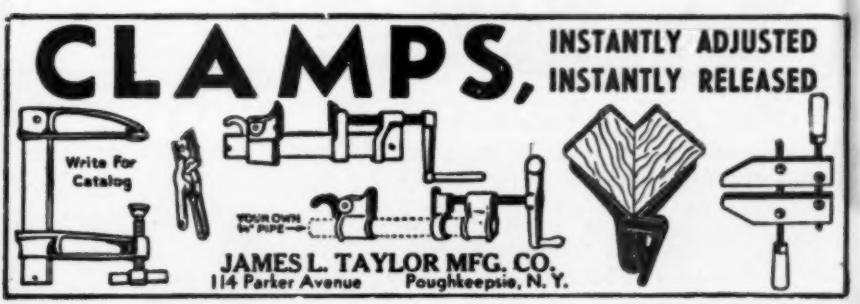
F.P.R.S. PLANS MEETING FOR '52

The Forest Products Research Society has announced the location and dates for its 6th Annual National Meeting to be held in Milwaukee, Wisconsin, June 23, 24 and 25, 1952. Upwards of 1,000 persons are expected to be in attendance at the program which will include presentation of technical papers on a wide range of forest products subjects, as well as visits to nearby wood utilization and wood supplying plants.

The Forest Products Research Society is a semi-technical organization of 2,300 persons throughout the world who are engaged in or are interested in forest products research, development, production, utilization and distribution. Its activities are carried on through an organization of 11 geographic sections throughout the United States, with national headquarters at Madison, Wisconsin. Its previous National Meeting and Industry Show was held at Convention Hall, Philadelphia, in May, 1951, with 2,300 persons in attendance.

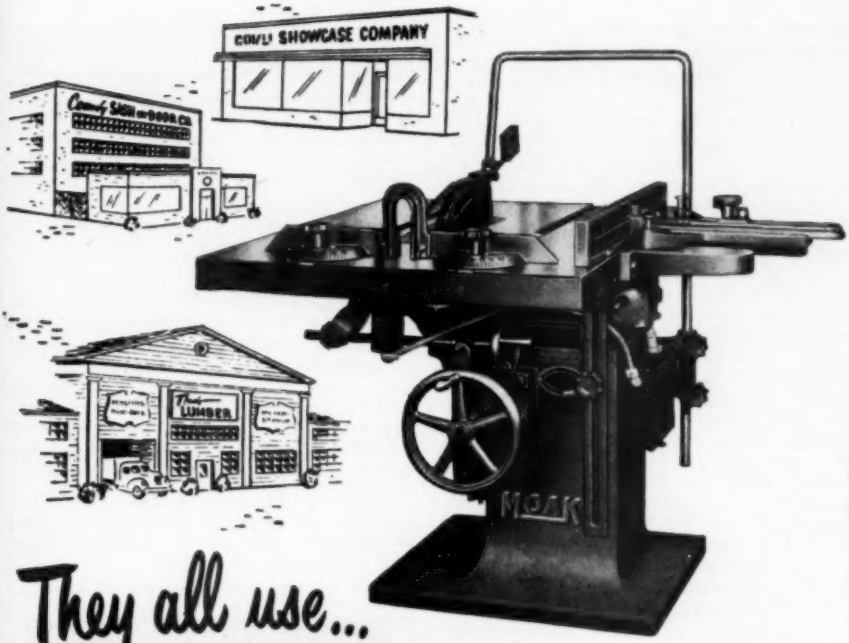
Officers and Board members of the Society include: president, Roy M. Carter, professor, School of Forestry, North Carolina State College, Raleigh, North Carolina; president-elect, Kenneth G. Chesley, director of research, Crossett Lumber Company, Crossett, Arkansas; vice president, Robert D. Pauley, manager, Development Center, Weyerhaeuser Timber Company, Longview, Washington.

Executive secretary is Frank J. Rovsek, Box 2010 University Station, Madison, Wis.



Mechanics Through The Ages

AMONG THE MECHANICAL INVENTIONS CREDITED TO LEONARDO DA VINCI, FAMED PAINTER, ARCHITECT AND ENGINEER OF 16th CENTURY ITALY, WERE THE SILK WINDING MACHINE, THE ALARM CLOCK, THE WHEELBARROW, THE ANTI-FRICTION ROLLER BEARING, LINK CHAINS AND SPIRAL GEARS.
IN THE MIDDLE AGES MEMBERS OF CRAFT GUILDS WERE OBLIGED TO HAVE TOOLS APPROVED AS "GOOD AND HONEST" BEFORE USING THEM ON ANY JOB.
WORLD'S FIRST INTERCHANGEABLE PARTS WERE MOVABLE PRINTING TYPES. THESE TYPES, FIRST DEVELOPED IN THE LATE 1400's, WERE COMPLETELY STANDARDIZED AND FULLY INTERCHANGEABLE.



They all use...

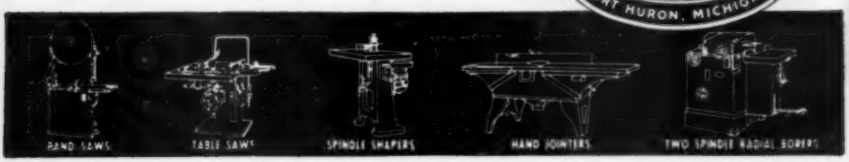
Moak All-Purpose Saw Tables

TO CUT BOTH HEAVY MILL JOBS AND FINE SHOP WORK WITH UNERRING PRECISION

Capacity for cutting stock up to 5⅝" thick and accuracy for fine work are both available in this one machine—the Moak No. 16-A All Purpose Saw Table. Functionally designed throughout for efficient operation, Moak Tables raise, lower, or tilt at a turn of a hand wheel. Accurately graduated cut-off gauges adjust in V-slots machined in the polished semi-steel table; rip fence has rack and pinion adjustment. Choose from two models, three drives.

Get the facts **on Moak Saw Tables right away. Write for our colorful booklet.**

MOAK MACHINE & TOOL CO.
MOAK
PORT HURON, MICHIGAN



RESINS FOR BONDING WOOD WASTE

Three types of Synvar resins are being successfully used for wood waste bonding, we are told by the Synvar Corp., Wilmington, Del. These are: Synvaren CP-25, a liquid phenol-formaldehyde type resin; Synvarite PNL-170HL, a phenol-formaldehyde resin in powder form; Synvarol WR-515-C, a liquid urea-formaldehyde resin.

The type of resin to be recommended depends entirely on the form in which the wood waste is available for processing and on the properties and appearance of the finished material, states the Synvar Corp. Generally speaking, a liquid phenol-formaldehyde resin can be successfully used in bonding coarse wood waste, regardless of its uniformity, particle size and the type of wood. Wood shavings mixed with finer particles, and hardwood mixed with softwood can be bonded successfully with this type of resin.

Powdered resin is more suitable for finer wood waste or wood flour, where the surface appearance is very important and when the wood particles are quite uniform. Articles molded from wood waste and Synvar PNL-170HL are claimed to have a good appearance and are waterproof.

For a fast curing cycle and with coarse wood waste, a liquid urea-formaldehyde resin is suggested. This resin is not, however, recommended for articles exposed to moisture or highly humid atmospheres. It is used mainly for cores faced with veneers, plastic or phenolic type wood waste bonded sheeting.

Major uses of resorcinol-type adhesives in peacetime are in boat building, in prefabricated homes and in some aircraft construction. The advent of a less-costly adhesive with qualities closely approximating those of straight resorcinol adhesives, however, is expected to extend uses to other fields.

ADVERTISING AND ITS ROLE IN WAR AND PEACE

Advertising is a vital cog in our free enterprise system . . . a potent medium for distributing information. Designed to provide a well-rounded compilation of attitudes toward advertising in war and peace, as expressed by officials and representatives of the Government, this booklet is composed of exerpts of speeches, articles, letters and statements lauding the advertising industry.

Order from Superintent of Documents, Government Printing Office, Washington 25, D. C., using Catalog No. C 18.225:5. 20 cents.

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AUTOMATIC GUAGE
for Swing Saws
SAVES $30 to $50 A MONTH IN LUMBER AND LABOR
30 Days Free Trial
ORDER NOW OR SEND FOR CIRCULAR
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"Tool Up With Woodworkers"

DOES YOUR MORTISE EQUIPMENT MAKE A CLEAN, STRAIGHT CUT LIKE THIS?

BEARING TROUBLE?

Try the special lubricated Renold bars. Cut your bearing trouble to a minimum. Use Renold guide bars and mortise chains. A wide range of sizes to choose from. One of the world's finest lines of mortise cutting equipment, used all over the world. Many sizes in stock for immediate delivery.

WOODWORKERS' TOOL WORKS
220 South Jefferson St. Chicago 6, Ill.

THE MARKET PLACE

FOR SERVICE
FOR EMPLOYMENT
FOR USED AND REBUILT EQUIPMENT

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Lists of Used and Rebuilt Machinery, either For Sale, Wanted, or For Exchange, set in uniform style, will be published in the Classified Section at the rate of $7.00 for name and address and a five line advertisement. For additional lines, only 70c per line.

DISPLAY ADVERTISEMENTS: 1 inch (Minimum), $8.00; 2 inches $16.00; 3 inches (Maximum), $23.00.

Write directly to those offering the machine for sale, for prices and full descriptions. If what you seek is not advertised, write Hitchcock Publishing Company, 222 E. Willow Ave., Wheaton, Ill., making known your wants on either new or used machinery and the publisher will gladly assist you.

FOR SALE

STANDARD of COMPARISON
THE "HART" LINE

Largest stock of used machinery in America, many ball-bearing, motorized. Substantial savings. Prompt shipment. Write for our list. We equip plants completely. We also buy complete plants or individual machines.

Earle Hart Woodworking Machine Co.
565 W. Washington Blvd., Chicago 6, Ill.
Phone RAndolph 6-4970

VICTOR PETERZELL & CO.
1269 Culver Road Rochester 9, N.Y.

Bandsaw, 20" Porter-Cable, b.b.
Bandsaw, 30" Wright, V-drive
Belt sander, Mattison, b.b. dmd.
Clamp, 8'x4' sash-door, Hermance
Glue jointer, Jenkins, b.b. d.m.d.
Moulder, 12" Woods, b.d., 40 H.P.
Nailer, Doig 6-18" cleater, c.b.
Nailer, Morgan No. 9, closed back
Nailer, Morgan No. 9-26" open b., clinch
Planer, Buss No. 4, 26"x7", sgl. d.m.d.
Planer-Matcher, Woods 14"x6", b.d.
Ripsaw, Yates-Amer. No. 21, b.b., d.m.d.
Ripsaw, Mattison No 207 s.l., b.b., d.m.d.
Sander, Mattison No. 177 edge belt, b.b.
Shaper, Whitney dbl. elec. freq. chgr.

FOR SALE
S. W. Harrington, Inc.
P. O. Box 230 **Asheville, N. C.**

Air Compressors, various sizes
Bandsaw, Amer. 42" pb. bd.
Band saw, New Crescent 20" bb. dmd.
Band saws, Amer. B-36 36" bb. & motor
Band saws, New Moak 36" bb. dmd.
Borers, McKnight No. 88 dmd.
Borer, Amer. 2 spindle radial dmd.
Borers, Moak 2 spdle. horiz. bd.
Borers, Indiana 15 H 2 spdle. dmd.
Borer, Root 2 spindle horiz., dmd. style "K"
Boring & sawing, McKnight 26F dmd.
Clamps, Handy No. 71 revolving
Clamps, Wysong & Miles case, air.
Clamp, Taylor, 40 sec. 4 clamps, 7 ft.
Clippers, Coe 88" bd. & motor.
Dovetailers, Dodds, 10-15 and 20 spindle.
Dowel Driver & Gluer, Bell No. 8 dmd.
Frequency changers, 15 KW and 50 KW dmd.
Glue jointer, F&E No. 429, bb. dmd.
Glue jointer, Jenkins No. 343A bb. dmd.
Hog, Mitts & Merrill No. 5 bd.
Jointer, Amer. 12" bb. dmd.
Jointers, New Moak 12", bb. dmd.
Lathe, Yates No. 74 bb. dmd.
Mortiser, W&M No. 285—5 spindle horiz. dmd.
Mortiser, Sidney, single spindle pb. bd.
Mortiser, Greenlee No. 228 Vert. bd. & motor
Planer-Matcher, Yates A1-15"x6" rd. hds. pb. bd.
Planer, Amer. No. 4½—24" sgl. bb. v-belt.
Planers, New Crescent 24" bb. dmd.
Redrier, Merritt 12 plate 36x72
Resaw, Connell & Dengler Circular pd. bd.
Router, Defiance, 2 spindle bb. dmd.
Routers, Carter, floor type, Hvy. duty, electric
Routers, Yates-Amer. U-9 high speed
Sander, Berlin, 31" 3 drum, roll feed bd.
Sander, Mattison No. 134, pb. bd.
Sander, Mattison No. 138 Belt, hand, bb. dmd.
Sander, New Jefferson, hand block, bb. dmd.
Sander, Smith 49" 3 drum endless bed.
Sanders, F & E 60" 3 drum roll feed, dmd.
Sander, Mattison No. 172 edge belt bb, dmd.
Sander, B & M 14 flat sander & motor
Sander, 48" double disc, dmd.
Sanders, McKnight sgl. drum 24"x16" dmd.
Sanders, Nash No. 25—10 spdle. dmd.
Sanders, W&M No. 171 belt, pb. bd. & motor
Saws, Famous, cutoff, bb. dmd.
Saws, DeWalt cutoffs
Saws, Diehl No. 44, bb. dmd. str. line.
Saws, New Delta-Crescent 12" tilt. arbor, dmd.
Saws, Buss Tilt table Variety bb. dmd.
Saws, Yates G5 gang rip, pb. bd.
Shaper, Sherril Sgl. Spdle. bb. dmd.
Shaper, Defiance dbl. spdle., bb. dmd.
Shapers, New Moak single spindle, bb. dmd.
Taping machines, Dennis No. 2
Tenoners, Wilkins-Challoner No. 70, bb. bd. & mtr.
Tenon Heads, single & double end.
Tenoner, Hayes 6 ft. dbl. with copes, pb. bd. & motor
Tenoner, F&E Sgl. with copes and motor pb. bd.
Veneer Jointers, Jenkins Saw—6 ft. bd.
Veneer Press, Francis 84x48
Woodworker, Crescent, pb. bd.
Many other items, send your inquiries.

FOR SALE

Woodward Machinery Co.
309 E. Second St. Cincinnati 2, Ohio

Band saw; Egan 34 in. with mtr. $175
Band saw, Parks, 16 in., M.D., $75
Box Nailers, 4 and 6 track, Doig, $550
Chair machinery bargains
Clamp, American, 8x4 ft. Door, $250
Jointer, Oliver, heavy, 16 in., $225
Jointer, Fay, light, 16 in. $175
Molder; Smith 6 in. 4 side, light, $400
Molder; American No. 3, 7 in. with mtr., $750
Mortiser, New light, HC, $100
Pony Planer, American, No. 1, 20x6, M.D., $375
Pony Planer, Trevor, 24x3, B.D., $250
Pony Planer, Parks, 12x4, B.B., $150
Sander, Boss, 39" two drum, $350
Sander; Vonnegut brush, $150
Saw; Moak, tilt, table Variety, $175
Saw, F & E No. 291 double cutoff automatic, $750
Shaper, Delta, sgl. sp. BB, MD, $185
Sticker, American, 1 side with P&B att., $250
Wood Worker, 12 in. Surfacer, jointer, band saw and ripsaw, $375

FOR SALE

L. R. Kenner
3325 Trinity Road Louisville 6, Ky.

Band saw, 36" Crescent ball bearing Carter disc wheels, 3 HP direct motor drive
Glue Cooker, Black 8-gal. electric
Glue jointer, Jenkins No. 3CDA motorized
Lathe, 30" Imperial Auto. Turning, M.D.
Router, Onsrud W-240D, 5 HP two-speed
Sander, 54" Nash No. 77 2-Spl. auto. turning.
Sander, 43" Yates No. 401 3-dr. roll feed
Sawing, boring and chucking machine, Bell No. 24 Auto. double end.
Woodworker, Sidney Universal, five machines.

FOR SALE

Clifton Machinery Co.
1023 W. 6th St. Cincinnati, Ohio

Saw Dust and Shavings Mill Exhausters and Blowers—Hundreds in stock, sizes to suit any need. Also Air Compressors, Fans, Rotary Blowers, Money Savers—Send Specifications.

All machines rebuilt and fully guaranteed.

FOR SALE

American Machinery Exchange, Inc
Woodworking Machinery—new & used
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Moulders, sanders, self-feed rip saws, band rips, routers, glue jointers, saw tables, planers, and many other items of new and used machinery.

Send us your inquiry.

Yates 2 Side Planer No. 177, 30" with 12" opening, 2 motors 25 and 15 HP Ball Bearing in good condition. Now in use and can be seen in operation.

FORSTER LUMBER COMPANY
Milwaukee, Wisconsin

FOR SALE

1—No. 4 Brown & Sharpe Universal Milling Mahcine, complete with dividing head, rack cutting attachment, vise and several arbors, motorized. Very good condition.

1—28" Heavy Duty Columbia Shaper with swiveling vise, motorized. Excellent condition.

Both machines $6000.00.
Immediate Delivery.

M. B. McMAHAN & CO.
SEVIERVILLE, TENN.

FOR SALE

HARDWOOD FLOORING MACHINE

S A Woods 501-B ball bearing Flooring Machine complete with two eight knife top cutter heads, one set of six knife side heads, an extra set of side spindles and a set-up stand for the heads. Ready to operate.

PARKER & STEARNS INC.
JOHNSON, VERMONT

IMMEDIATE DELIVERY

New Delta 20A-30A-40A-50A Ball Bearing Radial Saws
20" Ball Bearing Band Saw
New Millbury Bench Tenoner, M.D.

AAA SAW & TOOL SERVICE AND SUPPLY COMPANY
1401 W. Washington Blvd. Chicago 7, Ill.

FOR SALE

Mattison No. 221 all electric 6" Moulder

Yates 36" late type Band-saw. M.D.

David V. Lundberg
3415 Highcrest Blvd. Rockford, Ill.

FOR SALE

36" YATES-AMERICAN No. 1 Jointer, ball bearing, four knife round head with guaranteed 10 HP, 3600 rpm, 220/440. Serial No. B10547. Would make excellent facer.

Glue Jointer and Edge Moulder, YATES-AMERICAN No. 213, with two 5 HP, 3600 rpm, ball bearing cutter motors and vise grip heads. 1½ HP, 1800 rpm feed motor. Feed speeds 20/40/55/75 f/m. Jointer bar.

30" MATTISON 55C Automatic Shaping Lathe with guaranteed 10 HP, 1800 rpm, 220/440 motor. V belts, head and complete set of gears. Short feed rod, no center table.

24" AMERICAN Facer Jointer with JACKSON and CHURCH feeder. 5 HP, 3600 rpm arbor. Belted feed by 5 HP, 1800 rpm motor with slide rails. In good operating condition.

120" Beech Double Cutoff and 82 double mitre with two 5 HP, 3600 rpm, ball bearing tilting mandrels. Carriage travel 24".

TAYLOR glue wheel, 60 section, 96" with Gardner ratchet drive

ALL MACHINES FOR 220 v., 60 cy., 3 ph.
EXCEPT WHERE NOTED

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Fincastle Bldg., Clay 1608, Louisville 2, Ky.

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DOWEL RODS
DOWEL PINS
GLUE POTS
JOINT NAILS

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IMMEDIATE DELIVERY

Late type No. 125 ONSRUD AUTOMATIC SHAPER
12½ H.P. Complete with 15 KW Frequency Changer 220 Volt 60 Cycle 3 Phase with 10 H.P. Drive Motor

MONICAL MACHINERY CO.
GRAND RAPIDS, MICHIGAN

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Final month of Sale. No reasonable offer refused.

Planer, jointer, rip and cutoff saws, scarfer, facing surfacer, moulder, radial drill, glue spreader, chain mortiser, belt sander, tenoner, blower system, 1½ ton truck, misc. equipment.

Send for descriptive list.

R. J. HAFNER CORP.
Smithtown, Long Island, N. Y.

FOR SALE

Wooden box machinery, including printers and nailers
6 Drum Top and Bottom Sander.
American No. 35 9" All Electric Moulder
Porter No. 562 Router with Frequency Changer
Band Resaw
Oscillating Feed Mortiser
Smith No. 505 43" Endless Bed Sander, DMD
Band Saw Mill, Complete

BOSHCO, INC.
200 Boston Ave. Medford 55, Mass.

50,000—Fir Plywood Discs—19½" Dia. x ¾" Thick
100,000—Fir Plywood Pieces—8¾" x 9½" x ¾" Thick
50,000—Wood Wheels 2½" Dia. x 7/16" hole thickness from ¼" to ⅜"

AMERICAN WOOD WORKING CO.
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SPECIAL SALE OF COMPLETE EQUIPMENT FOR CHAIR MANUFACTURING

For Fraction of Replacement Cost
Over 32 Machines, Clamps, Fixtures Including

OLIVER No. 200 Gang Oscill. Bit Mortiser
NASH Saddle Seat Boring Machine
McKNIGHT Steam Retorts & Hydraulic Benders
AMERICAN No 80 Double Surfacer
REYNOLDS MA 384 Auto. Screw Driver
SMITH Horizontal Borer
ONSRUD No. W-311 Oscillating Bit Router
AMERICAN Horizontal Borer
NASH No. 53, Automatic Dowel Sander
NASH No. 4 Chain Feed Double End Saw & Chuck
NASH No. 5 Chain Feed Double End Saw & Chuck
JENKINS No. 2, Type "R" Dowel Machine
JENKINS No. 127 Gang Bit Mortiser
CENTRAL MACHINE WORKS No. WS-3 Post Boring Machine
NASH No. 36 Chair Post Sander
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REYNOLDS M 630 Automatic Screw Driver

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Richardson Baby Crib—Boring & Chucking Machine
Dennis Veneer Jointer
Hermance Door Clamp—Foot Oper.
Union Case Clamp, 27x48 opens 60"
Screw Press, 4x11 ft.
Moulder, 4" American Ball Bearing
2 Bell Dowel Drivers, One No. 7 and One No. 8

All equipment in first class condition. Extremely low prices.

WILL TAKE IN AS PART OF TRADE

Late Model 42" Planer, ball bearing, direct drive jointer and grinding att.

TYRE MFG. CO., INC.
328 S. Date Ave. Alhambra, Calif.

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Woodworking plant 10,000 sq. ft. floor space well equipped. Own rail siding. Very diversified. Good labor and lumber area. Low taxes. Excellent profits. Reason for change — illness of owner.

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WHEATON, ILLINOIS

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Our Rebuilding is Unequaled

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Appraisers • Liquidators • Rebuilders

TENONER

Greenlee No. 545—36"x80". Copes, Saws, Tenon Heads. Excellent. Immediate shipment.

Branyan & Peterson, Inc.
503 South Second St. Memphis, Tenn.

HEAVY DUTY GREENLEE 24" BALL BEARING JOINTER. Practically new. Well suited to work in connection with self feeding attachment.
Also jointers from 12" to 30".
More than 150 machines to select from.

The Osborne & Sexton Machinery Co.
COLUMBUS 16, OHIO

NEW MOTOR DRIVEN MACHINES

Kornau Hollow Mortiser	$ 165
Wallace Hollow Mortiser	450
Yates 20" Band Saw, 3 Phase	483
Yates 16" Band Saw, 1 Phase	328
Powermatic 16" Planer	711
Belsaw 12" Planer, less motor	215
Darra James 12" Tilting Arbor Saw	285
Hutchinson 8" Jointer	465
Powermatic Chain Mortiser	642
DeWalt Saws ½ to 7½ H.P.	
Disc Sander 12", Floor Type	54
Northfield 12" B.B. Jointer	721
Northfield 12" B.B. Jointer, less mtr.	521
Sash Relisher	450
Northfield 36" Band Saw	1390
H & A 12" Swing Saw	375
Powermatic Tenoner	863
Enterprise Pulley Mortiser	585

Woodworkers' Tool Works
220 S. Jefferson St. Chicago 6, Ill.

Only GENUINE parts WILL KEEP YOUR Jenkins MACHINES IN TOP CONDITION!

GENUINE JENKINS PARTS ARE MANUFACTURED AND STOCKED EXCLUSIVELY BY

JENKINS MACHINERY CO.
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SHEBOYGAN FALLS, WIS.

Motor Driven
FREQUENCY CHANGERS
IN
STOCK

Sizes: 10 to 60 KW
Outputs: 90-100-120 and 180 cycle
Reliably Rebuilt
1 YEAR GUARANTEE
Attractively Priced
SAVE MONEY when you BUY any ELECTRICAL EQUIPMENT
We actually have one of AMERICA'S LARGEST STOCKS
Send us your Inquiries.

L. J. LAND, INC.
Est. 1910 (39th Year)
Corner Lafayette & Grand Sts.
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- 1 Glover 8' Ball Bearing Bolter
- 1 American No. 1 Band Rip Saw
- 1 Fay & Egan Roll Feed Rip
- New and used wooden box machinery
- 1 Mereen Johnson No. 477 Automatic Cut Off
- 1 Mereen Johnson Automatic Shook Squeezer
- Morgan and Doig Nailers
- Planing Mill Equipment
- New Newman No. 512 Available
- New Automatic Lumber Trimmers

CHISM & BURTT
MACHINERY CO., INC.
26 Bennett Street Lawrence, Mass.

FOR SALE

One No. 413 YATES-AMERICAN 42" endless bed two drum sander, coupled MD, Bab. Bearings 220 volts. Good condition. F.O.B. Texas shipping point.

H. W. COPPRIDGE
P.O. BOX 24 WACO, TEXAS

FREQUENCY CHANGERS AND MOTORS, GENERATORS, TRANSFORMERS

1 — 1500 H.P.
Bought and Sold New and Rebuilt

ELECTRIC EQUIPMENT CO.
ROCHESTER 1, N. Y.

Andrews Vertical Borer, 6'—4 spindles, power feed, belt driven

Andrews Vertical Borer, 12'—5 spindles, power feed, motor driven

Pringle & Brodie Horiz. Borer, 6 spindle

Greenlee No. 238 C Mortiser and Borer for chisels up to 2½" square, timbers up to 18"x20" with two adjustable boring spindles

Greenlee No. 210 Vertical Mortiser for chisels up to 1½" square

WOODWORKERS' TOOL WORKS

220 S. Jefferson St. Chicago 6, Ill.

SHAPERS—DOUBLE SPINDLE

Rebuilt Whitney and Defiance, ball bearing, belt and motor drive, 7200 RPM, 5 HP. 84" Table $1500.00. 66" Table $1250.00. 30" spindle centers. Can furnish long spindles and overhead bearings—$100.00 extra. Offer subject to prior sale.

BRANYAN & PETERSON, INC.

503 So. Second St., Memphis, Tenn.

Yates-Am. A 20 15" Planer & Matcher.

Yates-Am. 35 9" Electric Moulder.

Smith 404 30" Elec. 3 Drum E B Sander.

Yates 108 Moulder, 10" & 15" Sizes.

Yates C-4 8" Moulder-Slip on Heads.

Yates 156 30" Sing. Surfacer, Sectional.

Porter 30" Facer & Herzog Feeder.

These and others here in stock.

R. K. HASKEW & CO., INC.

1916 Dayton Boulevard

Chattanooga 5, Tennessee

Yates G-2 self feed rip saw. M.D.
Greenlee No. 371—6 ft. Bor. mach. M.D.
Yates No. 275 Knife grinder B.D.
Wysong & Miles No. 316 Mortiser. M.D.
Wilkins Challoner 8 ft. dbl. end tenoner
Mattison No. 138-B overhead belt sander. Arr. M.D.
Yates S-3 Edge belt sander. M.D.
Wysong & Miles No. 303 disc & spindle sander. New.
Mitts & Merrill No. 15 CRSC Hog.

HARRIS MACHINERY CO.

510 - 30th Ave., S.E.

Minneapolis 14, Minnesota

NEW KORNAU HOLLOW CHISEL MORTISER
NEW 12" B.B. TILTING ARBOR SAW
NEW 12" and 20" PARKS B.B. PLANER
NEW No. 5 H and A M.D. SWING SAW
No. 24B BELL DOUBLE END SAWING, CHUCKING AND BORING MACHINE, M.D., 220 VOLT, 3-60, COMPLETE WITH ACCESSORIES.

AAA SAW & TOOL SERVICE AND SUPPLY COMPANY

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FOR SALE

24x48 Maple octagon 2 compartment tumbling barrels, tight and loose pulley, perfect condition. BARGAIN $50.00 each.

24x24 Maple octagon tumbling barrels. $30.00 each.

MILL SUPPLY

500 - 2nd Ave., Watervliet, N. Y.

HIGH FREQUENCY MACHINE

Well known old-line manufacturer of woodworking equipment has developed a high frequency edge gluing press with many interesting and practical features. Would like to discuss with interested woodworking plant placing pilot model of machine in production, preferably in Eastern part of U.S.

Address replies to Box 605

c/o Wood Working Digest, Wheaton, Ill.

MATTISON 207 Straight Line Rip Saw, DMD

EAGLESFIELD Straight Line Rip Saw, DMD

X L Moldmatcher

ROOT 6' Horiz. Boring Machine, dmd

COVEL-HANCHETT Knife Grinders, Model GK36

BLACK Glue Clamp Carrier, new

OLIVER Pattern Makers Lathe, 24"x8'

ROGERS Vertical Boring Mill

Surplus & Salvage Co., Inc.
Jamestown, New York

WANTED

BILLER AND DETAILER

For millwork and store fixture plant to make full size details and material bills of architectural woodwork and custom built store fixtures. Plant area 50,000 sq. ft., 60 men employed. Equipped from stock cutting to spray finishing. Modern machines. Finger Lakes region village. Good salary. Permanent position. Advise fully regarding qualifications and references.

WALKERBILT WOODWORK, INC.
Penn Yan, N. Y.

MACHINERY WANTED

SINGLE MACHINES OR COMPLETE PLANTS—No machine too small or plant too large to interest us. Will pay spot cash. Advise what you have for sale.

J. LEE HACKETT CO.
1961 EAST MILWAUKEE AVENUE
DETROIT, MICHIGAN
Appraisers • Liquidators • Rebuilders

WANTED

Plant Foreman or Superintendent completely familiar with the manufacture of bowling pins. This is a well financed company — presently expanding its operations and located about 500 miles from this city. Moving expenses will be paid. Qualified men answering will be interviewed in home town or expenses paid to plant. This is a once in a lifetime opportunity for security amid pleasant surroundings.

Address replies to Box 607

c/o WOOD WORKING DIGEST
WHEATON, ILL.

WANTED

One mill foreman and one millwright, also a yard foreman familiar with dry kilns for large new plant by old established company making dimension and panel stock. Located in central Mississippi, will be in operation sometime in August. Good opportunities for right men looking for permanent place.

Write full details concerning self and experience

c/o Wood Working Digest
Address replies to Box 603
WHEATON, ILLINOIS

An alert manager, E. M. Story of the Biederman Furniture Company, suggested an ad asking for 100 old living room suites on a trade-in promotion scheme, sold more than 50 new ones, depleting stocks on certain types so that reordering was necessary.

SUTTON GUARANTEED

BORERS

Root Vertical Power Feed Gang Borer
Multiple Spindle Vertical Fay & Egan Borer
Amer. No. 2½ Single Spin. Horiz. Boring Mach.

CLAMPS

Taylor 40 Section Air Operated Clamp Carrier
Handy No. 103 Frame Clamp
Automatic Edge Gluer with Taylor Panel Flow Glue Spreader
29 Section 6½' Power Operated Billstrom Clamp Carrier

DOVETAILERS

10 Spindle Dodds Dovetailer
Dodds 12-Spindle Dovetailer
Wysong & Miles No. 290 Auto. Dovetailing Mach.

GLUE SPREADERS

Practically New Black Bros. 12" Motor Driven Edge Glue Spreader
New Union Conveyorized Edge Glue Spreader
Taylor Panel Flow Edge Glue Spreader
61" Francis Dble. Rubber Roll Resin Glue Sprder.

GRINDING ROOM EQUIPMENT

American No. 9 Automatic Knife Grinder
New Hanchett Automatic Band Saw Grinder for 7" Blades

JOINTERS

Yates-American No. 213 Direct Motor Driven Glue Jointer
12" direct motor driven ball bearing Hand Jointer

LATHES

Mattison 42" No. 57-D motor drive ball bearing
Mattison 30" No. 55-C motor drive ball bearing
Large quantity Mattison Lathe Heads with carriers and knives

MORTISERS

Wysong & Miles No. 288 direct motor driven 6-spindle mortiser
Wysong & Miles No. 286 Hinge Seat Mortiser
Greenlee No. 227 direct motor driven single spindle mortiser

MOULDERS

Yates-American 4" Type C-69 Electric Moulder
Yates-American 4" Type C-88 Electric Moulder
Mattison 6" No. 276 Electric Moulder
Yates 10" Type C-55 Electric Moulder
Practically New 12" Vonnegut Electric Moulder
Newman 6" No. 46 Electric Moulder
Hayes Sash & Door Sticker w/Plowing & Boring

SINGLE PLANERS

New Crescent P-24 Direct Motor Dr. with Grinder
Whitney Ball Bearing Direct Motor Driven
Yates-American 24" No. 1 Direct Motor Driven Ball Bearing Facer with Four Post Herzog Feed

DOUBLE PLANERS

Yates-American 30" No. 177 Ball Bearing Direct Motor Driven with electric Knife Grinder

SANDERS

Yates-American 43" No. 431 Direct Motor Driven Endless Bed Sander
Mattison No. 124 Automatic Stroke Sander
Pearson Waterfall Sander
Oakley Semi-Automatic Stroke Sander

BAND RESAWS

American No. 4 Band Resaw

CUT-OFF SAWS

DeWalt Model GE 10 HP Practically New
Yates-American No. 51 Direct Motor Driven Swing Saw
Yates-American No. 2 Direct Motor Driven Ball Bearing Double Cut-Off Saw
Beach Direct Motor Driven Ball Bearing Double Cut-Off Saw

RIP SAWS

Mattison No. 207 Direct Motor Driven Ball Bearing Glue Joint Rip Saw
Yates-American G-7 Direct Motor Driven Ball Bearing Chain Feed Rip Saw
American No. 15 Ball Bearing Chain Feed Rip Saw
Mereen Johnson No. 441 Ball Bear. Gang Rip Saw

ROUTERS

Porter No. 600 Electric Router

MITRE SAWS

Bell No. 12 Direct Motor Driven Ball Bearing Double Miter Saw

SHAPERS

New Crescent Type S-2 Single Spindle Shaper
Whitney No. 139 Double Spindle Electric Shaper
Whitney No. 251 Double Spindle Electric Shaper
Whitney No. 234 Double Spindle Electric Shaper
Whitney No. 393 Automatic Single Spindle Shaper
Onsrud W-125 Double Spindle Automatic Shaper

TENONERS

Fay & Egan No. 505 Direct Motor Driven Ball Bearing Single End

VENEER MACHINERY

Francis 76" Hydraulic Veneer Clipper
Dennis Veneer Taping Machine, Motor Driven
Diehl No. 69 Veneer Jointer Direct Motor Driven
Merritt 8 and 10 plate redriers 84" by 54"
Francis Hydraulic Veneer Press 84"x36"
Merritt 13 Plate redrier 60 by 36

MISCELLANEOUS

Leitelt Lumber Lift
Porter No. 3MB Pedestal Type Spindle Carver
Motor Driven Ball Bear., 150 HP Corless engine
76" Coe Veneer Clipper
100" Coe Veneer Clipper

SUTTON WOODWORKING MACHINE CO.

Sedgefield Inn **Phone 2-4186** **Greensboro, N. C.**

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MONICAL'S RE-BUILT LISTINGS FIRST
FOR THE LATEST (AND BEST) IN WOODWORKING MACHINERY

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PARTIAL LIST

√BORERS
Valley City Two-Spindle Horizontal
Andrew 8' Horizontal
No. 95 Andrew Horizontal
No. 369 Greenlee Multiple Spindle 6' Vertical
Root BM Vertical

√CLAMPS
Taylor 30-Section 8' Caterpillar Type
Billstrom 39-Section 8' Caterpillar Type
No. 96 Handy Case Clamp
Handy Revolving Carrier
Palmer 6" Wheel Type Clamp Carrier
New Handy No. 54 and No. 55 Chair Clamps

√DOVETAILERS
Dodds 15-Spindle

√JOINTERS
Porter 30" with 4-post feeder
Dennis Veneer Jointer
Hand Jointers 12" to 24"
Chain Feed—Meyers, Fay & Egan, Diehl, Jenkins
Jenkins Saw Type Veneer, ball bearing, 6' and 8'

√LATHES
No. 55C Mattison Ball Bearing, Motor Driven Automatic Turning
No. 57D Mattison 40" Lathe

√MOULDERS
No. 276 Mattison Ball Bearing, Direct Motor Drive
American 4" Babbitt Bearing, Belt Dr.
Fay & Egan 7" Plain Bearing, Four-Hd.
Woods 8" Plain Bearing, Belt Drive
No. 226 Mattison 12" Ball Bearing, Dir. Motor Drive
Diehl-Vonneaut 6" Ball Bearing Direct Motor Drive

√PLANERS
No. 177 Yates 30" Roughing, Double
Buss 30", 36", 44" Single; 30" Double
Whitney 30" Single
Whitney 36" Double

√SANDERS
No. 10 Nash Six-Spindle; No. 25 Ten-Spindle
No. 171 Wysong & Miles Moulding
Yates Three-Drum Endless Bed 43" and 30" coupled motor
Smith Ball Bearing, Motor Drive Three-Drum

√SAWS
No. 202 Mattison Chain Feed Rip
No. 207 Mattison Chain Feed Rip
Clement 54" Band Resaw
Bell No. 12C and No. 12A
6' and 7' Buss, and Hall & Brown Hand Feed Double Cut-Off
No. 312 Yates 44" Band Rip, Chain Feed
Wilkin-Challoner Double Cut-Off
Beach 80" Double Cut-Off

√SHAPERS
Porter Double Spindle
No. 200 Porter Single Spindle
Buss and Whitney Double Spindle
Whitney Automatic
Onsrud WA-50S Automatic, sliding spindle

√TENONERS
Fay & Egan Single End
Eaglesfield Saw Type, ball bearing

√MISCELLANEOUS
No. 928 Covel-Hanchett Automatic Circular Saw Sharpener
No. 300 Francis Flat Plate Edge Gluer (New)
6, 8 and 12-Plate Merritt Redriers
No. 7 and No. 8 Bell Dowel Drivers and Gluers, motor drive
Francis 30"x72" Hydraulic Veneer Press
Salstrom 24-Spindle Multiple Carver
Doig Nailing Machine
Wysong & Miles Electric Multiple Horizontal Mortiser
Merritt 65" Veneer Clipper
Onsrud S-175 Automatic Shaping Attachment for Onsrud W-240 Router
Sheridan 36" Veneer Clipper
Loeffler Toilt Seat Sander

SPECIALS FOR THIS MONTH
Practically New Bell No. 100 Borer

MONICAL MACHINERY COMPANY
260 LEONARD ST., N.W. **GRAND RAPIDS 4, MICHIGAN**

BORING MACHINES

Andrews 6 spindles 8' Horiz. foot feed
Jones Superior radial, 1" to 16"
Prybill—radial 1" to 12"
Single spindle horizontal

DOVETAILERS

Dodds 10, 15, 20 spindle

JOINTERS

American 12" Wedge Bed BB
American 16" Wedge Bed BB
12" Colloday L. Powers, HB Smith, Crescent Sidney

LATHES

Mattison 55C BB Live Tailstock

MORTISERS

New Britain, No. 7, chain
Northfield chisel mortiser, motor driven
Wallace chisel mortiser, motor driven

MOULDERS

Mattison No. 224 9" all electric, hopper fd.
Mattison 229 8" All Electric
Vonnegut 6" DMD BB All Electric
Yates American No. C55—18" all electric
Yates American C55 9" DMD All Electric
SA Woods No. 107 12" 5 heads, belt driven
S.A. Woods 701 all electric DMD12" x 4"
SA Woods No. 131 9", belt driven
American No. 20 7", belt driven
American C4A 8"x4" B.D.

PLANERS

American Saw Mill 24" single DMD BB
Buss No. 4 BB 30" single Sec Feed & Chip CMD knife Grinder
Northfield 24" single, MD motor fd. No. 5
American 24" single, belt drive
Smith 24" Facing Planer MD BB Power Fd.

PLANER & MATCHER

Fay & Egan No. 156 20"x8" 6 hds., belt dr.

SANDERS

Peerless 9" 14" and 20" horizontal
Peerless 9" 14" Vertical
Wysong & Miles, Oakley, Mattison belt
HB Smith 42" 3 drum, endless bed, MD BB No. 401
HB Smith 42" 3 drum endless Bed Plain Brg. belt drive
Yates No. 431 30" 3 drum endless bed belt drive

SAWS - BANDSAWS

Tannewitz 36" DMD 32" under guide
American No. 4 40" rip and resaw
36" American, Tannewitz, Crescent, Oliver
27" Crescent Band Saw
Yates V40 48" BB Angle Bandsaw
Northfield BB & DMD 20" to 36"

SAWS - CUT OFF

Porter C43 5 HP DMD BB
Beach 5 HP DMD BB
Heston & Anderson No. 5, No. 25 & No. 55
Multiplex 5 HP DMD BB
Unipoint 3 HP DMD BB
Wallace 2 HP DMD BB
DeWalt 1 to 5 HP DMD BB
Jenkins No. 105A double cut off and mitre saw, 96"x60" MD motor feed BB

SAWS - RIP SAWS

Sinker Davis, self feed gang, BB belt dr.
Mattison No. 207 BB MD Belt Feed
Hermance Straight Line Plain Bear., BD
Beach Self feed gang, DMD 15 HP BB

SAWS - VARIETY

American Saw Mill 5 HP DMD Tilt Arbor
American No. 10 tilt top belt drive
BM Root tilt top belt drive
Mereen Johnson, double tilt arbor, DMD BB with carriage
50 other makes to choose from

ROUTERS

Ekstrom Carlson New No. 232 & No. 337
Ekstrom Carlson Nos. 156 & 434
Onsrud W 240D

SHAPERS

L. Powers single BB - MD
Union Single spindle BB MMBD
Defiance Double spindle, DMD with tilting and sliding heads
Whitney 2 sp. automatic BB MD No. 105
Yates N2 BB MD

TENONERS

Crescent single end, 5 head individual motor drive, BB
Fay & Egan No. 70 Single end belt driven
American No. 1 Single end belt driven

MISCELLANEOUS

Electric Carpenter 5 machine combination all ball bearing motor driven.
NEW—Taylor caterpillar clamp carrier 60 sections, 6½' centers 32" wide clamps, air rotation.
Union case clamp.
American dowel machine BB
Covel Hanchett Band Re-saw grinder MD
Greenlee & Amer. Door clamps, Sash clamps
Morgan Double Lock Corner No. 8
Fay & Egan No. 470 Jigsaw

Endless canvas belts, large variety of lengths and widths, also sand belts for Skilsaw, Porter Cable and Vonnegut brush sanders. Accessories and supplies, tremendous lot both new and used. Also band and resaw blades.

WE PAY CASH FOR ENTIRE PLANTS OR INDIVIDUAL MACHINES

American Machinery & Motor Co., Inc.

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YOU will SAVE by buying "Fader Rebuilt Machinery"

FADER REBUILT MACHINERY

BAND RESAWS
McDonough 54" Ballbearing, Dir. Mtr. Dr. (new)
BAND SAWS
Superior 36" Single, B.B., M.D.
Superior 42", ballbearing, motor driven
American No. B-38, 38", Ball bearing, Mtr. Dr.
BORERS
Andrews 60" 6-Spindle, Horiz., DMD Power Feed
Valley City, 2-spdl., adj. radial, motor driven
American 2-spdl., adj., radial, motor driven
Superior 2 Spindle Adjustable Radial, BB, D.M.D.
Superior 3-Spindle., Adjust. Horiz. Motor Driven
Wysong & Miles No. 283B, Sgl. Spdl. Vert., B.B. D.M.D (Like New)
CLAMPS—ASSEMBLY
Bell Chair Assembly, Air Operated (like new)
Bell 4-way Hi-Jaw, Air Operated
Bell 4-way Frame & Chair Back, Air Operated.
Bell No. 95 Revolving Case Clamp, Air Operated.
CLAMP CARRIERS
Handy 18-sec., 5 ft. wide, 38" clamps per sec.
Taylor 12-Section, 6½" wide, 32" clamps per sec.
DOVETAILERS
Dodds 25 Spindle, motor driven, spiral gears.
DOWEL MACHINERY
Bell No. 4-A capacity ¼"-2", M.D., B.B.
Bell No. 8 Auto. Gluer & Dowel Dr., Dir. M.D.
Hawker No. 2, capacity ¼" to 2", B.B., M.D.
Nash No. 4 Dowel Rod Sander, motor driven
FACERS—JOINTER FEEDERS
Porter Herzog 30", Ballbearing, Round Hd., DMD
American 24" Ballbearing, Round Head, Motor Driven, with Billstrom Feeder
JOINTERS
Fay & Egan No. 217, Continuous Chain Feed
Jenkins No. 3CD, Cont. Chain Feed, BB., D.M.D.
American 12", Round Head, motor driven
JIG SAWS
American, self-contained
Oliver No. 173 Self-contained, D.M.D.
Superior, Self-contained, motor driven
MORTISERS
Greenlee No. 228 Vert., Hollow Chisel, M.D.
MOULDERS
American No. 1, 4", 4-Side, Motor Driven
American No. 1, 6", 4-Side, Motor Driven
American No. 35, 7", 4-Side, All Electric, B.B.
Mattison No. 262, 6", 4-Side All Electric B.B.

PLANERS
Superior 28" Single, Motor Driven
Buss 4-L, 30" Single Cabinet, b.b., d.m.d.
Buss No. 4, 30" sgl. cabinet, M.D.
American No. 112, 30" single, motor driven
ROUTERS
Porter No. 502, 2-spdl., B.B., D.M.D.
Porter No. 600 High Speed, Ballbearing, DMD
SANDERS
American No 2, 24" Disc and Oscillating Spdl.
American No. 5 Drum Sander, D.M.D.
Ekstrom Carlson No. 23 Scroll Sander, BB, DMD
Ekstrom Carlson No. 18 Double End Pneumatic Drum, B.B., D.M.D.
Fay & Egan Hand Block Belt, Motor Driven
Indiana No. 12 Edge Belt, Ballbearing, D.M.D.
Mattison No. 138 Hand Block Belt, Motor Driven
Mattison No. 172, Oscillating Edge Belt, Mtr. Dr.
Pryibil 20" Horizontal Belt, Motor Driven
Pearson Model A Universal Edge Mounting Sander, B.B., D.M.D.
Yates No. 430, Hand Block Belt, Motor Driven
SHAPERS
Onsrud W125 72" Automatic, multiple stations, B.B., direct motor driven, with frequency chngr.
Buss, Sgl. Spdl., Hi-Speed D.M.D., B.B.
SAWS—CUT-OFF
Bell No. 12-B Dbl. Mitre and Cutt-Off, BB, DMD
Buss Double End, Motor Driven
Diehl No. 724, Floor Type, Str. Line, BB, DMD
Racine Floor Type—motor driven
Fay & Egan Double End, Motor Driven
Irvington No. 20, Floor Type, Str. Line, BB, DMD
Oliver No. 136 Ceiling Type Swing, BB, DMD, with Tables.
Yates-American, Floor Type, B.B., D.M.D.
SAWS—RIP
American No. 15 Chain Feed, motor driven
American No. 40 Chain Feed, Ballbearing, D.M.D.
Defiance No. 21-D Chain Feed—motor driven
Diehl No. 75, Straight Line, Chain Feed, Ball bearing, Direct Motor Driven
Mattison No. 207 Chain Feed, Ballbearing, DMD
SAWS—VARIETY
American No. 1, Tilting Table, Motor Driven
Dodds Tilting Table, Motor Driven
Pettingell, Tilt Arbor, Roller Table, M.D.
SHAPERS
Whitney No. 393 Automatic, Single Spindle, BB, DMD, with Frequency Changer
TENONERS
American, Single End, Tenon Heads, M.D.
McKnight No. 71C Chair Back Tenoner, M.D.
Towsley Single End, Tenon heads, lower cope, cut off saw, motor driven
VENEER MACHINERY
Black Bros. No. 115 36"x84" Electric Press, Direct Motor Driven
Dennis Continuous Feed Veneer Jointer, M.D.
Dennis Veneer Taping Machine, Motor Driven
Jenkins-Falls Veneer Jointer, B.B., motor driven
MISCELLANEOUS
Automatic, Floor Type, Direct Motor Driven, B.B.
Bell No. 13 Dovetail Gluer.
Bell No. 56 Hand Feed Chucking Machine, Ballbearing Direct Motor Driven
Black No. 5, 12" Edge Glue Spreader, Electrically Heated, Direct Motor Driven
Fay & Egan No. 253, Auto. Knife Grinder, 30".
Sturdevant 60" Exhaust Fan, Motor Driven
Sturdevant 60" Exhaust Fan, Motor Driven

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605 W. Washington Blvd., Chicago 6, Ill., Phone STate 2-7634

"If it's for Woodworking . . . We Have It"

BAND SAWS: Walker Turner 14" B. B. M.C.
American 20"
Crescent 20" Ball Br. New
Lehman 30" Bab. Br. $125.00
Wright 30"
Fay & Egan No. 345 36"
Fay & Egan 48" Belt or Motor Dr.
Moak 36" B. B. Band Saws (2)
36" Tannewitz Vee Dr.

BAND RESAWS
Connell & Dengler 60" Vertical, $1800.00
Yates V-54" Vert. Band Resaw
7" Blades, 40 hp motor
40" Band Resaw

BORING MACHINES: Fay & Egan No. 190 Single Spl. Vert.
Andrews 32" Double Col.
Root Single Spl. Motor on Spl.
Dennis Sgl. Vert. Universal
Greenlee Post Borer

BOX MAKERS MACHINERY:
Beach Box Maker Carriage Cut Off
Hall & Brown Box Board Matcher
Luther Box Board Matcher

CLAMP CARRIER: Handy 12 ft. 6 wheel 18 leaves 6—31" clamps each 95% New

CLAMPING MACHINERY: American fig. 8853 8 ft.
Rowley & Hermance Door Clamp 3½ x 8 ft.
Lancaster Pneumatic Chair Clamp
Handy No. 100 Bed Clamp
Black Bros. Chain Clamps
3000 Spring Clamps No. 2 and No. 3

DADO SAWS: Fay & Egan No. 5 C.O. and Dado
American No. 1 Dado Saw Auto.
Hall & Brown No. 134 Comb. C.O. Dado Saw Pwr. Fd.

CUT OFF SAWS: Oliver No. 94-D St. Line C.O. Saw with Roller Tables 95% New
Greenlee No. 453 Auto. Railway C.O. 7" cap.
Comet Timber C.O. 10 h.p. 44" blade
Beach Carriage C.O. Saw
Swing Cut Off Saws (several)
Fay & Egan Table C.O. Saw

DOWEL MACHINES: Fay & Egan No 406 Rod Mach.
Hawker No. 2 Belt or Motor Dr.
American Clement ¼" to 1⅝" cap. with 11 cutter heads, $375.00

JIG SAWS: Oliver No. 173-B Ball Br. Self Contained Motor built in. New at Bargain Price
Beach No. 1 Tilting Table Scroll Saw

JOINTERS:
Cordesman 9" Rd. Hd. Jointer
12" 4 knife Rd. Hd. Jointer
16" Fay & Egan No. 316 B.B. M.D.
16" American B.B. 4 knife Motor Dr.
Smith 16" 4 knife Jointer
Fay & Egan 20" rd. hd. Jointer
Fay & Egan No. 316 20" Rd. Hd. M.D.
Northfield (Late) 12" B.B. Motor on Hd.
Fay & Egan 24" No. 115 Belt or Motor Dr.
Moak 12" B.B. Jointer M.D

LATHE: Oliver 12"x5 ft. Sgl. Ph. Motor Headstock
Goodspeed type AV-4 Automatic
Wood Lathe Sets 12" to 24" swing
Goodspeed Variety Hand Feed
Goodspeed Variety Type A-V
American No. 7, 32" Patternmakers

MORTISERS:
New Britain No. 4 Chain with H. C. Attach.
New Britain No. 7 Chain, Compound Table M.D.
New Britain No. 1 Chain Mortiser
Wysong & Miles No. 134 H. C. Auto. Feed
Colladay Vert. H. C. Motor on spindle B.B.
American No 20 H. C. Comp. Table M.D.
American H C. Horizontal Auto. Feed
Crescent Hollow Chisel Mortiser

MOULDERS:
American No. 3 Heavy 6" 4 side
Fay & Egan No. 207 7" 4 side
Hermance No. 50 8" 4 side Bab.
Hermance 10" 4 side
Fay & Egan No. 184 12" 4 side
Fay & Egan 10" 4 side

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Doig 2 track Cigar Box Nailer
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American 26"x8" Double
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Fay & Egan No. 2 24"x6"
American No. 1 20"x6"
L. Power 24"x6" Motor coupled Head
Powermatic 12"x4" M.D.

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NEW MULTIPLEX RADIAL SAWS IN STOCK:
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No. 30-A¾ hp. single ph.
No. 40-A 1½ hp single ph.
No. 50-A 5 hp., 3 ph.

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Falls No. 103 St. Line B. B. Belt Dr.
Mereen Johnson No. 441 Gang
Greenlee No. 427 Self Feed

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SAW TABLES:
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Crescent No. 2, 3, and 5 Universal

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American No. 15 24" single dr. Hand Feed
American No. 15 30" single dr. Hand Feed
Mattison No. 115 Variety Belt Sander
Wysong & Miles No. 171 Belt Sander
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Wysong & Miles No. 303 Comb. 26" Disc

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Fay & Egan No. 265 Dbl.
Double Spindle B. B. Motors on spindle, 3000 or 7200 rpm
Porter No. 105 B.B. M.D. (late)

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Powermatic B. B. Tenoner

TIMBER PLANER:
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Buss 36" bab-brg., V-belt, motor-drive.
American 42" V-belt, motor drive.
Tannewitz 42" M.D.

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McDonough 62" Vertical Band Resaw.
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New Wysong & Miles, sgl. spdl. vert. d.m.d.
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Greenlee 36-in. No. 369 vert. gang, 8-spd m.d.
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MOULDERS
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Yates No. 108 9" belt drive coupled motor.
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Newman 4"x4" all Electric.
Yates No. C-89 10"x4" all Electric.
Vonnegut 12"x4" with Freq. Changer.

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F. & E. No. 156 24-in single, V-belt, m.d.
Buss No. 4A 36-in. 4-roll single, dir. m.d.
Buss 6A 36" 6-roll single, D.M.D.
Yates B2 36" double M.D.

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Porter No. 622 Vertical Ball Brg. M.D.

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Whitney No. 134 double-spindle dir. M.D.
Amer. No. 20 dbl-spdl. dir. M.D. Freq. Chgr.
Advance double-spindle, ball bearing, mtr. dr.
American dbl. spindle, belted m.d.
Onsrud W-248 single, ball bearing, m.d.
Whitney No. 282 Sgl. D.M.D. 36"x40" table
Onsrud W 123 Automatic 84" Cap.

SANDERS
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Smith No. 400 49" 3 drum End. Bed.
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Multiplex A50 Radial Arm, 2 HP.
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Greenlee No. 451 auto. cut-off and dado.
Buss double cabinet type, motor drive.
Porter 43-206 36-in. stroke, motor on arbor.
Oliver No. 94 straight line, direct mtr.-dr.

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Yates G-77 Chain Feed, D.M.D.
Smith No. 335-A self-feed, belt or motor drive.
Mattison No. 207 Chain Feed, Motor Drive.
Diehl No. 75 Chain Feed, Direct Motor Drive.

TENONERS
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Greenlee No. 534, Single End with cut-off, no copes, dir. m.d.
Jenkins No. 95 double end, jump dado, d.m.d.

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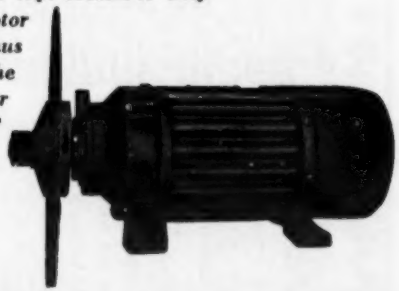

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Handy Case Clamp, 48" Cap.
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MOULDER
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Loeffler No. 609 motor driven
New Britain No. 2 Chain, M.D.

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Onsrud W122, Automatic Shaper, B.B., D.M.D., with Frequency Changer

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Lathe, Propeller Fahlin 10' motor drive with wood patterns and jigs
Lathe, Waymouth, Automatic
Mortiser, Crescent Hollow Chisel, New
Moulder, Yates C-2-3"-4 side, belt drive
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Planer, single 24x6 Northfield No. 5, New
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Rip Saws, Chain feed, Diehl No. 75 and No. 55.
Router, Onsrud Radial Arm with frequency chngr.
Radial Saws, New Multiplex No. 20A-30A-40A and 40B, single phase, 110-220 volts
Sander, Crescent 18" Disc, New
Sander, Belt, Auto., Curtis 6'
Sander, Disc and Drum, Fay & Egan
Sander, Nash auto. belt for Bowling Pins
Sander, Belt 8' Schimmel Reid Semi Auto.
Saw, 12" tilt arbor, Darra-James New
Saw Scroll, F&E Self Combined, 36" throat.
Saw Table, American No. 20, Double Arbor
Saw, Swing, H. & A. No. 5—10", New
Saw, Swing, H. & A. No. 25—14", New
Saw, Swing, H. & A. No. 55—16", New
Saw, Variety, Hall & Brown No. 131 with motor
Saw, Variety Sidney tilt table
Shaper, Crescent single spindle, M.D. New
Shaper dble. spindle Whitney with freq. changer
Shaper, Double Spindle Fay & Egan No. 265, belt drive with idler countershaft.
Shaper, American No. 20—with 2—5 HP motors
Tenoner, Hall & Brown No. 51 with copes
Tenoner, single end American No. 2½ with copes and cut-off and 7½ HP motor V-belt drive.
Tenoner, single end Hall & Brown No. 55 with copes and cut-off, belt drive
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Band Scroll & Resaw, 42", F. & E. No. 146, mtr.
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Borer, vert. double column, Andrew No. 75, b.b., automatic, 60", 10 h.p., 850 rpm mtr.
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Hayes 96"x40" Plain Bearing Belt Drive Double End Tenoner with 15 H.P. motor

Hayes 102"x60" Double End Tenoner

Mattison No. 55-C—30" Ball Bear. Automatic Shaping Lathe

Jenkins No. 65 Door Sticker

Ekstrom-Carlson No. 448 M.D. B.B. Vert. Gang Borer, 48"x22" Range

Yates S-7—6' Hand Lever Stroke Sander

Jones-Superior No. 145—30" Disc Sander

Yates 431—43" Two Drum Endless Bed Sander

Royal Invincible 43" Three Drum Roll Feed Sander

Wilkin-Challoner 72"x40" Electric B. B. Double Cut-Off Saw

Greenlee No. 495 BB Variety Saw

Crescent Dowel Machine with 5 H.P. Motor

Greenlee No. 110—36" BB, DMD Single Planer

Whitney No. 24—30" Motor Driven B. B. Double Planer

American 30" Ball Bearing Facer with Herzog Feeding Attachment

Porter 300-CM—24" Facer with Herzog Feeder

Fay & Egan 24" Jointer, with 7½ H.P. motor and Jointer Attachment

Meak 12" Motor Driven Ball Bearing Hand Jointer with 3 H.P. Motor

Mattison No. 244 BB Cut-Off Saw

Billstrom 6' 39 Section Clamp Carrier

Billstrom 7' 29 Section Clamp Carrier

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BAND RESAW
Fay & Egan No. 280, B.M., M.D.
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Greenlee No. 368 2-Sp. Horiz. M.D.
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CLAMPS
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Lancaster No. 500 Air End Clamp
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Reed 16" Turning Lathe, 16" Swing
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Wysong & Miles No. 181, 6-Spindle
American No. 10 Sash Mortiser & Relisher
MOULDERS
Hermance 6" 4-Side
American 8" 4-Side
4" & 6" Single Head Stickers
PLANERS
24", 30" and 36" Single
SANDERS
Nash No. 65 Automatic Turning
Wysong & Miles 16" Disc Sander
Curtis No. 11 Semi-Auto. Belt Sander
Porter-Cable B-6 Irregular Belt
American No. 2, 43" Roll Feed 3-Drum
SAWS—CUT-OFF
Porter Floor Type, with table
Y-A C-44 Floor Type, with table
Root No. 248 Double, 32"x82"
Bell No. 12 Double Miter
SAWS—CHAIN FEED
Mattison No. 204 and No. 207
American No. 15 Ball Berg., M.D.
SAWS—SELF FEED
Root and American
Hermance No. 31 Adjustable Roll
Greenlee No. 426—Yates No. 257
SAW TABLES
Tannewitz SJ Tilting Arbor
American Dbl. Revol. Arbor
American No. 7½ Comb. & Dado
SHAPERS
Whitney No. 8 Double Spindle
American No. 1 Single Reversible
Shimer Single Sp. Reversible
TENONERS
Fay & Egan Single End
American & Smith Single End
VENEER JOINTER
Jenkins No. 23 D.M.D. Ball Berg.

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"CONFAB"

The second issue of "Confab," Acme Steel Company's quarterly magazine, has been released. Featured in this issue are stories of how an integrated materials handling program was set up at Nabisco, how strap kits are being used in Korea, and how a Detroit manufacturer has effected a 25% production savings through metal stitching.

Also included are an interpretation of the latest government regulations covering wire-stitching and strapping of overseas shipments, a digest of the annual report, a chronicle of company news and a series of case histories told in capsule style.

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The mechanic gave the vehicle a lengthly examination, and after much testing, wiped the grease from his hands and drawled, "I don't see nothin' wrong, mister. It must be the good Lord a-warning you."

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BAND SAWS

Crescent, 32" & Calladay 36", tltg. top, bbt. brg. b-d.
Mereen-Johnson No. 205-48" ball brg.
Morshon 54", bbt.-brg. b-d., motor drive

BORERS

Fay & Egan No. 312—24"—4 spindle vertical
McKnight No. 25-B—horizontal, bbt.-brg., b-d.
Pratt & Whitney Universal vertical, 16 spindle, ¾" centers, motor-dr.

LATHES

Mattison No. 55C-ball-brg., automatic, motor dr.
Yates No. 74—ball brg., automatic, motor drive

MORTISERS

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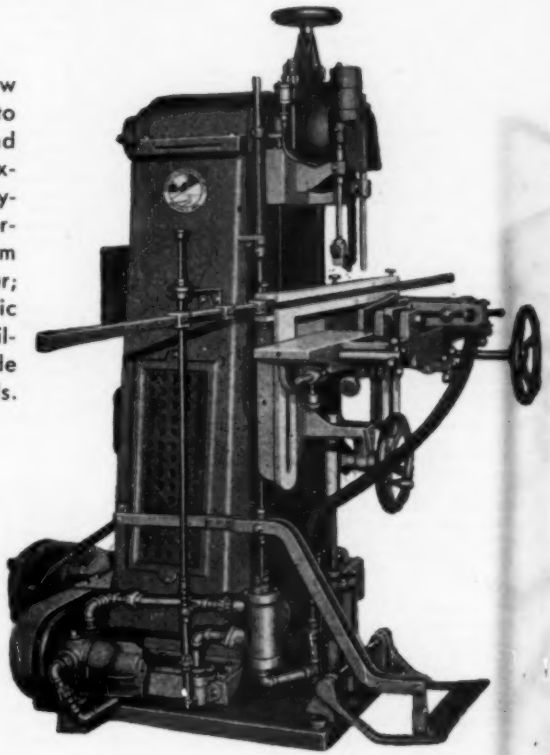

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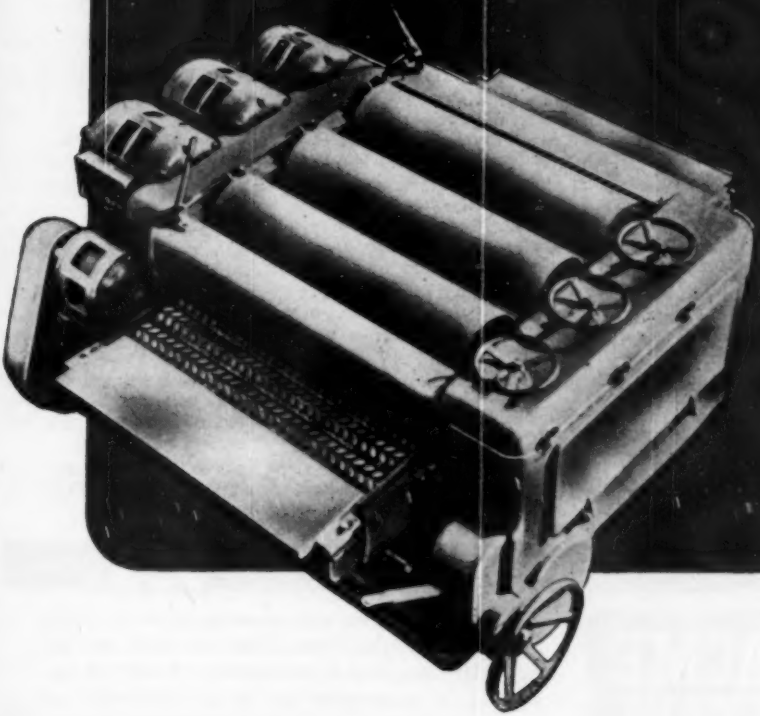


H. B. SMITH MACHINE CO.

SMITHVILLE, NEW JERSEY

"A little neglect may breed a great mischief."

—Ben Franklin's Almanac, 1757

Inefficiency and waste lay taxes with a heavier hand than Ye Collector of Internal Revenue. If thee get rid of the former, thee may better bear the latter.

—Acme Steel Notebook, 1951

Now, more than ever, it will pay you to take special heed of your packaging, shipping, and materials handling operations.

For right now, the demand for Acme Steelstrap and Acme Silverstitch Wire far exceeds the available supply. Increased civilian consumption and increased military needs make it impossible for Acme Steel to meet all the needs of our more than 50,000 customers.

To make the best use of the supply of Acme Steel products available to you, let your Acme Steel representative work with you on ways to increase efficiency and minimize waste. Let him show you how to keep your tools and equipment in shape and on the job.

There are no shortages in Acme Steel's experience or ingenuity, or in our willingness to help you—the way we have helped our customers solve their problems in the past 71 years.

Reference material on Acme Steel products and services is available on request.

ACME STEEL COMPANY

Dept. WD-81, 2838 Archer Avenue, Chicago 8, Illinois

We have 41 service offices in the United States and Canada. If one is not listed in your telephone directory, write us.

5 things you can do to keep your Acme Steel Strapping Tools on the job:

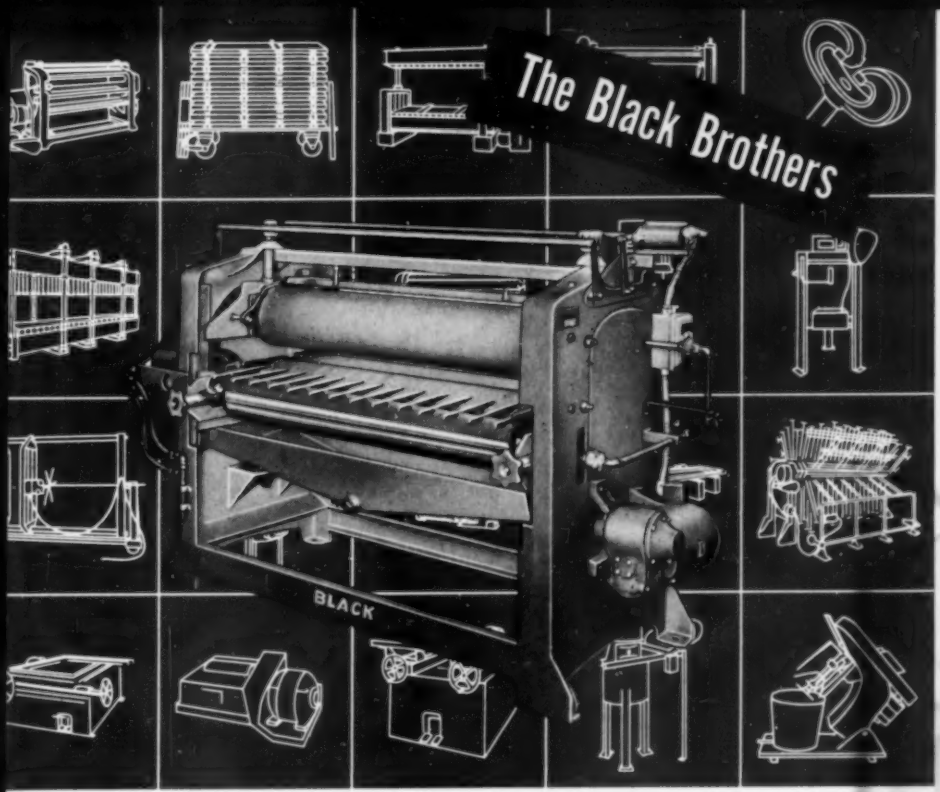
1. Clean and oil every week.
2. Check and clean gripping dogs weekly. Replace when teeth are worn.
3. Detect worn punches and jaws early by checking sealed joints regularly. If in doubt, submit samples, identified by model and serial number, to Customer Service Department, Acme Steel Company.
4. Keep parts list and supply of spare parts handy to make minor repairs. Additional parts lists supplied upon request.
5. Ask us about the Acme Steel "3-WAY SERVICE PLAN" for equipment repairs.

ACME STEEL CO. CHICAGO

ACME STEEL

Our strapping exhibit at The Chicago Museum of Science and Industry is visited each year by more than a million people. Have you seen it yet?

ACME STEELSTRAP flat steel strapping and ACME UNIT-LOAD carload bracing BAND, SEALS and TOOLS • ACME SILVERSTITCHERS and ACME SILVERSTITCH WIRE for box stitching • ACME-MORRISON METAL STITCHERS and BOOK STITCHERS • ACME-CHAMPION BAG STITCHERS • ACME HOT AND COLD ROLLED STRIP STEEL • ACME GALVA-BOND steel slat stock for Venetian blinds • ACME STEEL SPECIALTIES, including hoops, corrugated fasteners, nail-on strapping and other container reinforcements • ACME STEEL ACCESSORIES—snips, cutters, punches, tool mounts, reel stands, coil holders, coil trays.



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THE BLACK BROTHERS CO., Inc.

Mendota, Illinois

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☐ 156	6-Ft., 8-Ft., Hand Lever Stroke Sander.
☐ 177	Electric Oscillating-Belt Edge Sander.
☐ 202	Fast-Feed, Straight-Line Ripper.
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